COMPUTERWORLD

The Global 100
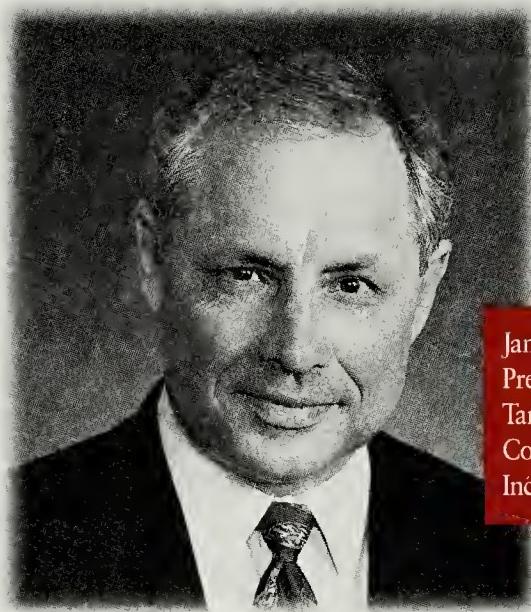
Outstanding Users of Information Technology From Around the World

Meet the *Computerworld* Global 100.

Tandem and its Partners are proud to sponsor this first in-depth, around-the-world look at the most innovative and efficient users of information technology, showcased by IDG *Computerworld* publications distributed in over 20 countries in 13 languages.

Increasingly, global commerce means that companies around the world face the same formidable set of business challenges. The enterprises profiled here are breaking new ground in the use of information technology to meet those challenges. In this publication you will see how they leverage technology to compete globally, improve service, cut costs, bring products to market faster, and use information in entirely new, thought-provoking ways.

And as impressive as these innovations are, more lie ahead. The experiences of the *Computerworld* Global 100 give us a window into the future of information technology, as well as showing us profiles of human ingenuity at its best.

On behalf of Tandem and its Partners, congratulations to the Global 100 winners, for being truly world-class 100.

Sincerely,

James G. Treybig

⫻ TANDEM

Role models

IN THE PREMIER ISSUE OF THE GLOBAL 100, *Computerworld* presents 100 of the most outstanding information technology users in the world. From true global corporations to exceptional government agencies, these organizations are defining how global business will be conducted in the future.

Any IS manager struggling with the challenge of being — or becoming — a global player should consider the organizations and people featured in the following pages as worthy of emulation.

The *Global 100* was a global effort in its own right. It will be translated into 13 languages and distributed in 22 countries. While editorial responsibility fell to the six-person Special Projects Team (pictured below), we drew on resources from all four corners — sort of a virtual global project. We tapped IS experts in more than 30 countries (see Nominating Committee, page 2); collected quantitative data from over 500 international companies; and coordinated reporting, writing and additional data-gathering with a dozen *Computerworld* publications worldwide and with IDG News Service bureaus in Frankfurt, London, Paris, Brussels and Tokyo. Special thanks to all of these contributors.

If publications had been included on the *Global 100* listing, we would have been a shoe-in.

Bruce Rayner
Editor, *Computerworld Global 100*

THE EDITORIAL TEAM
(left to right)
Bruce Rayner, Joyce Chutchian-Ferranti, Kimberlee Smith, Tom Monahan (back), Bob Fink and Amy Malloy

STELLA JOHNSON
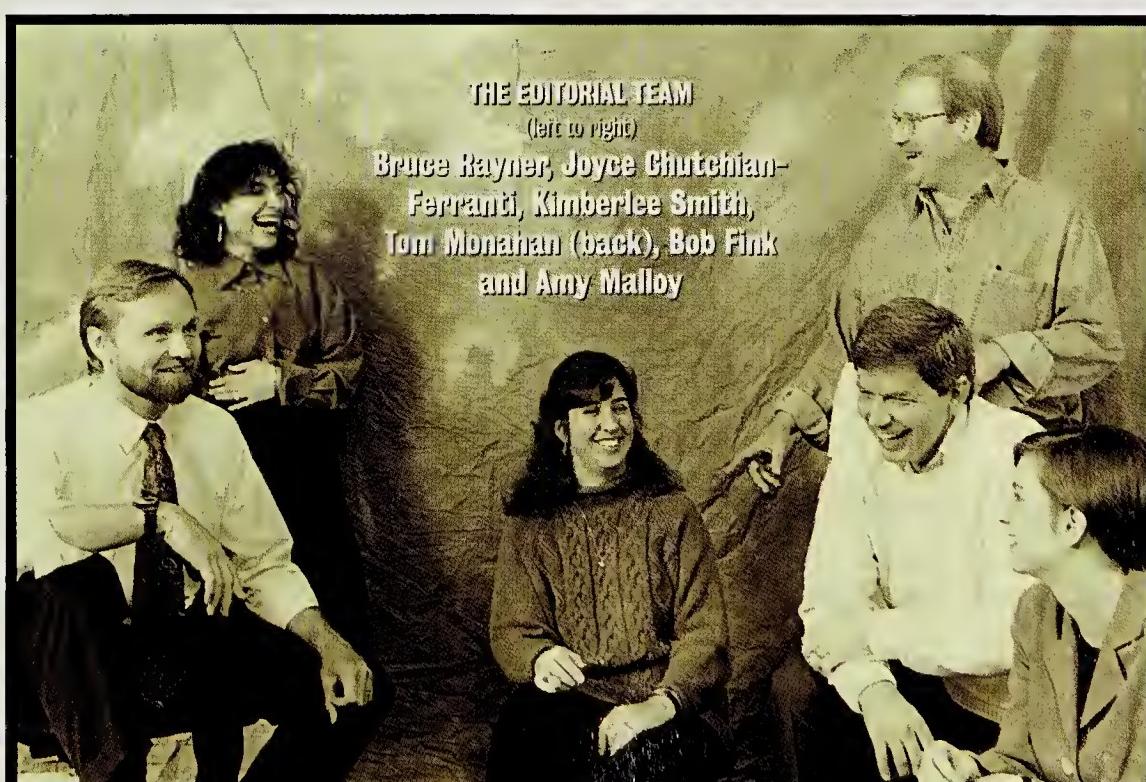
Overview

Whatever the language or time zone, **All Roads Lead to IT.** Our survey reveals many similarities in IT strategies among Global 100 nominees.

GLOBAL TITANS

It takes a strong head and sturdy backbone to be a world-class IT leader. Many are called, but few make the grade.

PHOTO ILLUSTRATION: KEVIN IRBY

Government Agencies

These **Public Sector Stars** look to information technology to increase efficiency and reduce costs.
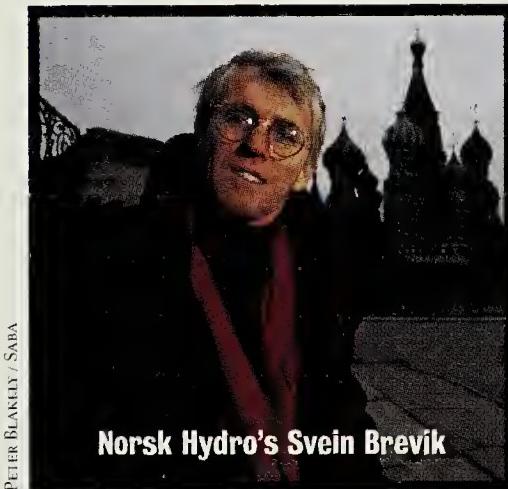
PETER BLAKELY / SABA

Norsk Hydro's Svein Brevik

ADRIAN BRADSHAW / SABA

Shanghai No. 2 Machine Tool Works' Lou Xin

Scania's Birgitta Strömberg in Sweden

Emerging Markets

Getting Wired Gets Weird in Eastern Europe and Russia as IS managers struggle to set up shop.

Emerging Markets

The Giant Stirs in China as free enterprise takes hold. IS is proving to be **An Elixir for India.**

Faces

Up close and personal with some of the **Global 100's IS managers.**

Nominating Committee

Many thanks to all who nominated organizations to the Global 100 list.

Mehmet Ali Altaca
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Turkey

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IDG
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Japan

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Gerard Bidal
IDC
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USA

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Ernst & Young
USA

Tracy Eastman
CTG, Inc.
USA

Oleg Gorbachov
Computerworld
Ukraine

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Sun Microsystems, Inc.
USA

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Computerworld
The Netherlands

Carlos de la Iglesia
Computerworld
Spain

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Australia

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South Korea

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Czech Republic

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Japan

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Institute, Inc.
Japan

Ney Kruel
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EMC Corp.
USA

Alexander Loisel
IDC
Austria

Chuck Malkiel
Digital Equipment Corp.
USA

J. P. Martinez
IDC
Brazil

Tokyo Electric's
Minoru Yoshikawa

TOM WAGNER / SABA

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First National Bank's
Mike Jarvis in South Africa
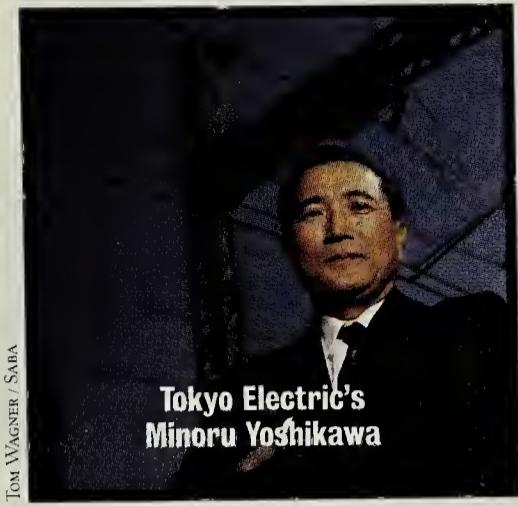
MIKE PERSSON / SABA

Japan

Japan's Global 100 companies achieve
Harmonic Convergence
by matching technology with the
way people work.

PAGE 26

Western Europe

National regulations make
Border Crossings difficult and
complicate the building of a
Pan-European infrastructure.

PAGE 34

Southern Hemisphere

Global 100 companies south of the
equator emerge **Out of the Shadows**
of their Northern neighbors.

PAGE 40

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The Global 100 Tables

Comprehensive tables detailing the Facts
and Figures of the **Global 100 companies.**

The Global 100

Industry/Description	Country	Revenue ($ in millions)	Profit ($ in millions)	IS employees	IS spending ($ in millions)
					$10
				130	More than $1,000
					$100–$249
			$75	2,500–4,999	$500–$1,000
			$3,900	500–999	$100–$
		$550	$551	1,000–2,499	$113
	Indonesia	$11,000	$1,345	1,000–2,499	$5–$9
	UK	$7,034	$948	227	$1
	UK	$52,425	$236	Less than 100	
		$12,218	$456	1,200	
...oration	UK	$14,600	$993	100–249	

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IDC
Italy

Martin Meier
Computerworld
Switzerland

Murli Menon
Computers &
Communications
India

Connie Moore
BIS Strategic Decisions
USA

Henry Morales
Computerworld
Mexico

Akdogan Ozkan
IDG
Turkey

Patti Phillips-Kahn
Keith Mary Rantas-Drew
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Christoph Witte
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Germany

At the age of four, Ben is a budding musician. Last week, after Dad listened to and bought several CDs from a telephone network's 3,000-album selection, Ben wanted to try. So far, he's listened to the same 10-second clip from Sleeping Beauty nine times, but he may be close to a purchase. This experimental music network was developed jointly by Tandem and one of its alliance partners.

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...scalable solution that's just right for you. Give us a call and we'll tell you all about it.

All roads

The Global 100

Outstanding Users of Information Technology From Around the World

Argentina
Sevel Argentina SA

Australia
Australia and New Zealand Banking Group
The Broken Hill Proprietary Co. Ltd.
Coles Myer Ltd.
Qantas Airways Ltd.
Telecom Australia

Belgium
AGFA Gevaert NV

Brazil
Banco Bradesco SA
Petroleo Brasileiro SA-PETROBRAS
VARIG Brasilian Airlines SA
Vale Do Rio Doce, Companhia

Canada
Metropolitan Toronto Police
Toronto Stock Exchange
TransCanada Pipelines Ltd.

Chile
CODELCO Chile-Division Chuquicamata

Czech Republic
Skoda automobilova AS

Egypt
Information and Decision Support Center

France
Aerospatiale
Amadeus
CNP Assurances SA

Groupe Paribas

Germany
BMW
Deutsche Bank AG
Deutsche Bundespost Telekom
Deutsche Lufthansa AG

Hong Kong
The Royal Hong Kong Jockey Club

India
Hindustan Lever Ltd.
National Informatics Centre
Tata Engineering & Locomotive Co. Ltd.
The Tata Iron & Steel Co. Ltd.

Indonesia
BankExim

Italy
Banco Ambrosiano Veneto S.p.A.
ENEL S.p.A.
Fiat S.p.A.
Telecom Italia S.p.A.

Japan
The Dai-Ichi Kangyo Bank Ltd.
Japan Finance Corporation for Small Business
Jusco Co. Ltd.
Kao Corp.
Misumi Corp.
NSK Ltd.
Nippon Telegraph and Telephone Corp.
The Nomura Securities Co. Ltd.
Seiyu Ltd.
Seven Eleven Japan Co. Ltd.

Sumitomo Group
Tokyo Electric Power Co., Inc.
Toyota Motor Corp.

Mexico
Cemex SA

The Netherlands
Royal Dutch PTT Telecom B.V.

New Zealand
Fisher and Paykel Ltd.
New Zealand Inland Revenue Department

Norway
Kvaerner Engineering AS

Saudi Arabia
Arab National Bank

Singapore
National Computer Board
Singapore Network Services

South Africa
First National Bank Holdings Ltd.

South Korea
Hyundai Corp.
The Kwangju Bank Ltd.
Pohang Iron and Steel Co. Ltd.
Samsung Electronics Co. Ltd.

Spain
Banco Exterior de Espana

lead to IT

IT MIGHT BE MONEY that makes the world go round, but information technology keeps the orb on its axis. Whether for intercity inventory control or intercontinental product design, the best organizations know how to harness information technology for competitive advantage.

The 100 companies listed in this issue are case studies in using information technology as a competitive weapon. Culled from more than 500 nominations submitted by information technology vendors, consultants and *Computerworld* editors in more than 40 countries, the *Global 100* brings together some of the most outstanding users of information technology in the world.

Who are the Global 100? They come from all industries and all corners of the world. Most are international companies, and some are true global players with highly integrated worldwide operations, such as Ford Motor Co. (see "Global Titans," page 13). Several are government agencies (see "Public Sector Stars," page 22).

Eighty-five percent of the Global 100

28% of companies surveyed said linking IT with business goals is the most important factor in being an international IT leader.

come from the most developed regions in the Northern Hemisphere: 28 from North America, 27 from Western Europe and 13 from Japan. But there is also fair representation from the rest of the world: Argentina, Australia, Chile, India, South Korea, New Zealand and the Ukraine.

Whatever the language or time zone, these companies share an innovative approach to information technology strategy.

Take, for example, Emirates Airlines, one of the fastest growing airlines in the world. In fiscal '94, the United Arab Emirates-based air carrier spent $28 million as part of its move to a client/server information architecture. While not without transitional headaches, the setup has Sun Microsystems, Inc. servers managing Emirates' corporatewide, mission-critical business applications, including airport ground services, accounting and passenger revenue, cargo, payroll and personnel.

"The ability to deploy both applications and systems more efficiently and more rapidly gives Emirates a strategic advantage," says Hugh Pride, senior general manager of information technology.

Strategic advantage. The mantra is repeated by many Global 100 companies. In many cases, advantage is being achieved through re-engineering, downsizing and conversion from legacy to distributed systems. Twenty-one organizations were nominated for their client/server systems, 20 for their networks and 12 for business process re-engineering efforts.

These trends are picked up in *Computerworld's* survey of the Global 100 nominees. The Top 3 factors identified by respondents as necessary for global information technology leadership were creating closer ties between business and IT; improving customer service; and understanding and using new technologies.

Other factors survey respondents mentioned include spending more on training and development for both IT professionals and technology end users; keeping a

tight rein on costs; strengthening vendor and customer partnerships; and initiating business process re-engineering. One company identified "risk-taking" as its key to leadership.

Many of the Global 100 companies combine these factors in their strategic plans. For instance, Codelco-Chile, the world's largest copper producer, recently went through a massive re-engineering project, outsourcing much of its information systems in an attempt to slash production costs. So far, Codelco says, it has managed to cut the cost of a pound of copper from 68 cents to 62 cents and expects to reach the world-class cost of 50 cents per pound.

As part of its downsizing and re-engineering initiative, The Kwangju Bank Ltd. in South Korea spent nearly $8.6 million on information systems last year. The bank transitioned from a mainframe environment to a distributed client/server architecture and revamped its on-line transaction processing system, says Ahn Tae Joo, Kwangju's general manager.

Compared with many of its peers on the Global 100 list, however, Kwangju's information technology investment is nothing special. With its investment averaging out to $4,500 for each of its 1,864 employees, Kwangju is only a middling information technology spender.

Of course, information technology spending can fluctuate dramatically from year to year. Budgets also depend on a company's health, the level of direct competition and the sophistication of the market. Five of Kwangju's competitors in the banking sector, comprising 23 companies — more than any other industry segment on the Global 100 list — spent more than $10,000 per employee in either 1993 or 1994. Three of those big spenders are European, and two are in the U.S.

Ukraine's Privatbank, Commercial Bank, however, spent less than $1,000 per employee in fiscal year 1994.

As expected, it is the technology-sensitive vertical market — primarily in the developed world — that reports the highest per-employee information technology spending: financial services reported an average spending of $27,442 per employee; the insurance sector averaged $19,815 per employee; and telecommunications weighed in at $10,170 per employee.

However, one of the Global 100's uncontested leaders in information technology spending per employee comes from Japanese consumer goods. Tokyo based Kao Corp., maker of floppy disks, consumer products and specialty chemicals, reports spending $27,000 per employee last year on building a global information technology empire. Kao, like leading-edge U.S. rival Proctor & Gamble Co., is investing in information technology to gather more detailed information on its customers and to meet the demands of quick response production and logistics (see "Harmonic Convergence," page 26).

How do these companies know they are getting their money's worth from information technology? According to the Global 100 survey, about half of all respondents measure the performance of information technology by asking their internal and external customers for feedback. Only about a quarter of the respondents say they use traditional return on investment (ROI) or cost/benefit calculations to justify information technology.

Bass PLC, a British food and beverage distributor, gets its feedback through in-house "customer care" surveys, according to Brian Wilson, information technology director. Likewise, Phillips Petroleum uses customer satisfaction and management perception of value added as two of its primary performance measures.

On the other hand, CSX Corp., a Richmond, Va.-based $9.5 billion transportation company, sticks with a more traditional quantitative approach. According to Joe Vasconcellos, manager of transportation system development, CSX insists on seeing an ROI on every project based on a three-year ROI.

CSX is among the majority of Global 100 companies that give their chief information officers virtually total control over international IT investment decisions. And the hot spot for investment this year is Western Europe: About half of those surveyed plan to increase their IT spending in Western Europe. The UK (17%) and Germany (12%) are mentioned most frequently as targets for increased IT spending.

✒ Written by Bruce Rayner, Computerworld USA. Included are contributions from worldwide International Data Group sources and Computerworld survey data.

The Global 100

50% of respondents evaluate IS management's performance using some measure of customer service.

49% of companies surveyed have targeted Europe for IS spending increases. The UK and Germany are mentioned most frequently.

82% have or plan to have an international information architecture and an international communications network.

72% of respondents have adopted common IS standards across their international operations.

92% have data communications links with their customers. Eighty-one percent are linked with their suppliers.

Credit this cashmere beret to David's slightly extravagant wife, Elaine...and Tandem. 66% of all credit card transactions worldwide are Tandem-based solutions, as are 50% of all electronic funds transfers.

Ted's buying breakfast again because his team, the Bullets, bit the bullet (again). So on his way to Lulu's Café he stopped by his automated teller– 75% of all ATM transactions rely on Tandem systems.

Mike, who keeps egging on Ted, works for UPS. Hot outfit. UPS transmits package and customer service information to 50,000 vans via the TotalTrack network developed by McCaw Cellular and Tandem. Not surprisingly, the network runs on our UNIX® servers.

If this coffee's not fresh, take it up with Lulu. A quick response inventory system just *smoked* this coffee through the distribution pipeline. And that speed means money. Last year, QR solutions saved the retail industry more than US$3 billion.

We make your life a whole lot richer. Why not your business, too?

Because we develop business solutions for the real world, chances are, we've got a parallel, scalable solution that's just right for you. Give us a call and we'll tell you all about it.

TANDEM

Today, there's one world, one market, and one consumer—with 5.7 billion differing tastes. That's why some of the world's largest retailers come to us for decision-support solutions. With the right DSS, you might have predicted when this man would buy a video camera—six months before he knew, himself.

Shades from L.A., tie from Paris, shoes from Milan, man from Tokyo. And cellular phone service from the heavens above, with a little help from us. Fact is, the world's 32 largest communications companies rely on Tandem technology.

Why not your business, too? TANDEM

scalable solution that's just right for you. Give us a call and we'll tell you all about it.

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When you do something
19,000,000 times a day,
without fail, you become
the best in the world.

Every second of every day, in more than 55 countries on six continents, one company shoulders the responsibility for millions of the world's electronic payments. ➤ In global markets everywhere, credit and debit card purchases, corporate wire transfers, automated teller machine and home banking transactions are all processed with complete reliability. · ➤ And they all depend on the software, systems and expertise provided by a company called ACI (Applied Communications, Inc.). ➤ ACI leads the way in financial, retail and networking solutions. More than half of our staff concentrate on research, development and customer support. With that kind of commitment, the world's best transaction processing software will only keep getting better.

ACI
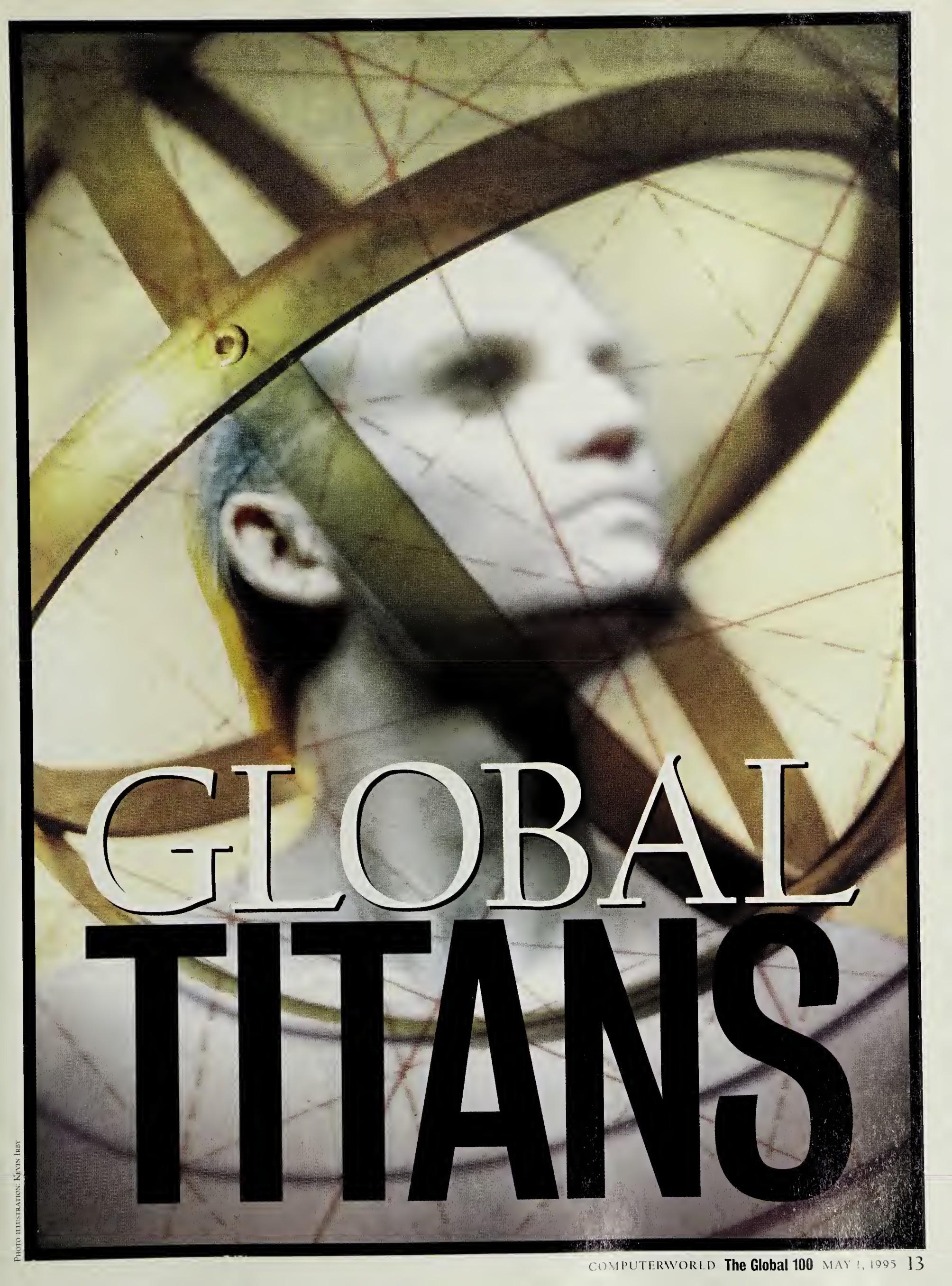
GLOBAL
TITANS

GLOBALIZATION MIGHT BE RAPIDLY SHRINKING THE WORLD, but not for technologists. In fact, Peter Gerard, executive vice president at Deutsche Bank AG, says the opposite is true. "If time and place equal zero, 'globally' doesn't exist anymore," he says. "Users are present anywhere, anytime by means of a global electronic network. This emphasizes the importance of transaction processing and real-time information access."

By **Joseph Maglitta**

And make no mistake: That kind of instantaneous, universal, postglobal service demands more technical supercharging than simply hanging a few more terminals off the old headquarters mainframe. It's one thing to run an international business with data centers in a couple dozen countries. It's quite another thing to automatically flash

thousands of financial results to traders on five continents. Or to let a design engineer in Turin, Italy, interactively collaborate on-line with colleagues in São Paolo, Detroit and Cologne.

No surprise, then, that leading global players, including ABB Asea Brown Boveri Ltd., Barclays Bank PLC, Nike, Inc., The Chase Manhattan Corp., Deutsche Bank AG, Ford Motor Co., Glaxo Holdings PLC, Kao Corp., NSK Ltd., Phillips Petroleum Co. and Toyota Motor Corp., are scrambling to invest millions in new infrastructures, networks, computer systems and updated personnel. Companies are betting that the massive, unprecedented tech-

A strong head. Remember that stereotype about technology-shy chief executive officers? The ones who leave information technology to "our technical people"? Forget it. One striking characteristic that truly global companies have in common is their leaders' zeal for information technology.

Take Andrew Buxton, group chairman at Barclays. Three years ago, Buxton felt that his senior staff wasn't paying enough attention to the latest technical advances, so he personally organized seminars for 60 top executives.

Today, the UK's largest bank brims with technology. A new sys-

It takes sharp eyes, a strong head and a sturdy backbone to be a world-class IT leader.

nology buildup will help them dominate new, borderless markets the way they dominated home markets in earlier eras.

"You can no longer run independently in the U.S. vs. the UK vs. Norway vs. China," says John Mihm, senior vice president of corporate technology at Phillips Petroleum, a $12 billion oil company based in Bartlesville, Okla., with operations in 17 countries. "We need to know what's happening in the other places."

Many companies are willing to invest awesome sums for the edge such information may provide: Deutsche Bank, for example, plans to spend $975 million on information technology this year.

Of course, the most global of the Global 100 companies don't just throw money at technology. Tough-minded shareholders see to that. But exactly what are these global pacesetters doing?

For starters, the information technology basics that consume many lesser rivals, including quality, re-engineering, cost control, efficiency and use of new technologies, are considered foundations, not destinations. Some of the world's best technology users share a surprising number of other features.

tem called Fraud 2000 is credited with spotting 14 frauds a day. Lending Adviser, an intelligent knowledge-based system, serves bank branches worldwide. Buxton himself chairs Barclays' new information technology board. Such bold commitment recently earned him recognition from the London Business School.

Many of Buxton's peers share his ebullience for information technology. Countryman Sir Richard Sykes, Glaxo chairman, waxes enthusiastic about how technology can speed drug manufacturing, generate faster return on investment and catalyze corporate re-engineering and change. At Swiss engineering giant ABB, CEO Percy Barnevik says any company that doesn't consider itself an information technology company is doomed. Some executives, including Phillips' new chairman, Wayne Allen, have even done tours of duty in information systems departments.

Another striking similarity: These giants don't go nuts trying to figure the exact payoff from every dollar, pound, yen or mark spent on technology. While all require cost justification, financial

United Parcel Service

With a 10-year, $3 billion technology plan, UPS hopes to strengthen electronic links with its 1.2 million customers

TECHNOLOGY LEADERS are made, not born. Just ask Frank Erbrick. In 1985, board members at Atlanta-based UPS concluded that the shipping company was lagging behind archrivals Federal Express Corp. and Roadway Services, Inc. in information technology.

Executives split. Some argued that "Big Brown" needed to pull itself into the technological age. Others noted UPS already had the best on-time record in the industry.

And the new UPS CIO? "I was dragged in kicking and screaming," laughs Erbrick, a 33-year UPS veteran.

The rest is industry history: Led by Chairman Kent "Oz" Nelson, the world's largest package delivery service launched a five-year, $2 billion technology plan. The buildup was awesome: In 1985, UPS's information systems group comprised a mere 118 people and spent $40 million. Today's IS staff totals 4,000.

Erbrick became a technology champion. His teams cranked dramatic firsts: In 1993, UPS created the first nationwide mobile data service, which linked 70 commercial carriers. A $180 million program placed handheld data collection computers in 53,000 vehicles. Last year, UPS became the first package deliverer to let customers use CompuServe and Prodigy to order services.

Has the investment paid off? Since 1985, UPS's annual sales have surged from $7.6 billion to $19.4 billion. Annual income climbed to $900 million, from $568 million. Technology also let UPS go global: It now delivers 3 billion packages a year to 200 countries and territories and employs 303,000.

It's difficult to say how much growth resulted from information technology. But there's no turning back: UPS budgeted another $1 billion for information technology between 1992 and 1997. And, Erbrick says, "we're going to exceed that."

Topping the new priority list is a new global customer automation system and worldwide deployment of the on-truck computers.

Next month, a revamped version of its Maxi-Ship package tracking system will reach 25,000 large customers. UPS says it will invest $100 million annually for the next few years on customer automation. By late 1996, Erbrick says, UPS will be able to provide real-time electronic data on each of the 12 million packages it will ship daily. UPS also hopes to create stronger electronic links with its 1.2 million customers.

Despite huge gains, the battle is not won. UPS trailed rivals DHL Worldwide Express and Fedex in Asia Pacific. Likewise, its UPS Worldwide Logistics subsidiary faces heavy competition for global distribution, warehousing and inventory management business.

But the once hesitant Erbrick remains undaunted. "Nobody in the industry will be able to touch us by the year 2000." 🌐

Written by Joseph Maglitta, a Computerworld USA senior editor.

| At a glance	
UPS delivers 3 billion packages a year to 200 countries and territories	
Annual IS spending	$200 million
IS spending per employee	$635
Annual IS spending as % of revenue	1.02%
Number of IS employees	4,000

Source: Computerworld estimates and company reports for fiscal year 1994
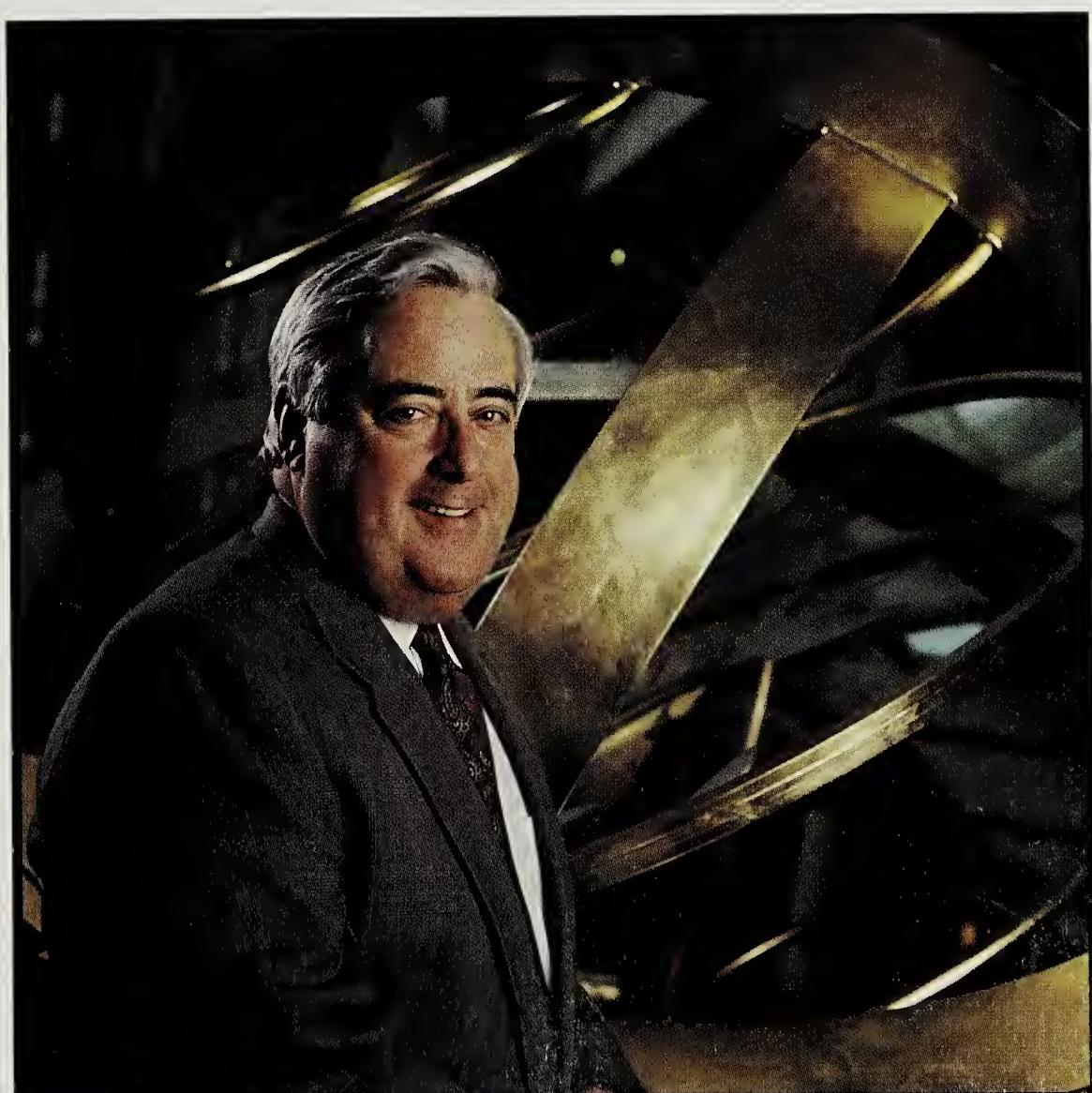
• **Technology champion Frank Erbrick** *steered an information technology buildup that has helped annual earnings at United Parcel Service nearly double*

considerations are being balanced with nontraditional measures such as customer satisfaction. In general, the trend is to assess technology as part of a project, not by itself.

Finally, strong bosses must have strong stomachs. Even in hard times, they can't be afraid to invest in information technology. In 1992, when Barclays suffered the first loss in its 300-year history, Buxton refused to slash information technology outlays or to lay off any of the bank's 7,000-person IS staff. He also locked the London-based firm's technology budget at about $1.4 billion.

Similarly, three years after New York-based Chase lost $334 million, turnaround Chairman Thomas G. Labrecque approved a technology budget exceeding $500 million — more than half the bank's annual earnings.

"Half the battle is winning people's confidence," says Chase Chief Information Officer Craig D. Goldman. "You have to paint a vivid description of what life could be like in the information age."

A firm handshake. The best global firms also cast executive support and business/technology links in organizational concrete. Thanks to systematic systems planning, distinctions between IS goals and business goals are fewer than they might otherwise be.

One big reason: Every technology boss in this group of companies reports to a chairman, president or other top executive rather than to a financial chief. CIOs routinely attend strategic planning meetings. Most of these global leaders employ a mixed, matrix

Another factor also boosts alignment: Increasingly, technology heads aren't technologists. Every CIO interviewed came from a general business background; many have MBAs. Ford's new CIO is its former research director. NSK's top IS manager spent half his career outside IS. While such links don't give information technology leaders carte blanche, they certainly bring technology into the inner circle.

Sharp eyes. If technology leaders had a maxim, it might be: "Think globally; act everywhere." Unlike international firms, which run scattered but unconnected or minimally linked operations, global firms view the world as a single, linked resource.

Kao, a consumer products manufacturer known for its floppy disks, and automotive components maker NSK have developed integrated systems that link sales, production scheduling, manufacturing and logistics. Both Tokyo-based firms are fully integrating their worldwide operations into these systems.

Challengers, NSK's new global system, will enable NSK to sell products on a global rather than regional basis. "The goal of our globalization efforts is to supply our customers at the most appropriate point, wherever in the world that is," says Masao Murata, general manager of NSK's IS department.

Few have looked harder or wider at linking global resources than Ford. On Jan. 1, the $108 billion Dearborn, Mich., automaker completed a massive global reorganization, called Ford 2000. One major goal is a $6 billion international program to build "world

Networks are the trade routes of the global village.

structure that combines centralized information technology guidance and services with decentralized technologists. At Barclays, Ford and elsewhere, a dozen or so top executives and technologists, including the CEO, sit on a high-level technology policy board. (One CIO describes this role as the corporation's "technology conscience.") A second board comprising business unit heads or divisional CIOs is also common.

In the field, companies disperse IS workers and much of the control into business units. A good example is Nike. In April, the Beaverton, Ore., maker of athletic shoes and clothing introduced a new global IS structure throughout 50 countries.

Like many other corporations, Nike had "six or eight major shadow information technology organizations," says Bob Kreinberg, vice president of operations. That led to expensive, duplicated effort and chaos. So after a year of planning, executives decided to reassign most of Nike's 750 technologists into front-line business units. A 200-member group at headquarters handles network platforms, operational standards, education and consulting for the $3.9 billion firm. A regional technology manager serves each continent.

Kreinberg says it's too early to judge success. One concern: "How do you manage without it becoming an exploding star?" Nonetheless, he says he is convinced the approach is sound.

cars" on three continents. To that end, five vehicle program centers were established in Germany, England and the U.S.

Moreover, Ford created six new international design centers in Europe, Asia and North America. These studios are linked to the company's new $84 million advanced engineering center in Dearborn via T1 lines, satellites and LANs. Engineers and designers will be able to do collaborative crash and flow analysis, simulations and other electronic work from networked workstations. Company officials say better use of global resources will boost design efficiency by 25% to 35%.

How do you provide information technology support for such far-flung operations in 30 countries? What gets globalized and what doesn't? Bill Powers, Ford's new executive director of IS and research, follows a rough guideline: "Anything that is basically purely technical should be global. As you run toward business, you hit a gray zone. Anything close to actual customers — sales and marketing — or employee relations should be more local. Data resides locally, but it's linked to a global system."

In other words, globalize only as needed. To support worldwide design, Powers' teams have deployed 500 Silicon Graphics, Inc. workstations, 90 Onyx Graphics computers and two Convex

ABB Asea Brown Boveri

IS juggles the paradoxes of international, multidomestic ABB without dropping the ball on centralized computing

THE WORLD'S LARGEST electrical engineering firm, ABB Asea Brown Boveri Ltd., began life by tackling global computing complexity. ABB hasn't stopped since.

Formed in 1987 by the merger of engineering giants Asea AB in Sweden and BBC Brown Boveri Ltd. in Switzerland, ABB gave its information systems personnel a daunting task: to create, within months, a single financial reporting application for 1,300 companies employing more than 200,000 people in 140 countries.

"You know how that goes: The IS people may say it's going to take two years to develop, and we say, 'No, guys, it should be ready the first quarter of 1988,'" says Bengt Skantze, a corporate development manager who now manages ABB Group Information Systems. "And it was ready the first quarter of 88."

Today, the unified reporting system remains one of Zurich-based ABB's few standard applications.

The $28 billion giant continues to balance the paradoxes facing an "international, multidomestic organization." The company considers itself global but with deep local roots; large overall but individually small, with 5,000 profit centers; decentralized but with centralized reporting.

Indeed, Skantze says his current challenge is balancing a diverse, decentralized structure while leveraging centralized efficiencies in purchasing and other operations. It's a big job. Even more remarkable is the fact that he directs ABB technology on a part-time basis with only two staffers. "We're lean and mean," Skantze chuckles.

How do they do it? IS operations mirror a two-dimensional company

• **ABB Group Information Systems manager Bengt Skantze** *and his small staff balance a diverse, decentralized structure while leveraging centralized efficiencies in various operations*

matrix. An IS steering committee serves major geographic and business entities. Each group meets several times a year to approve budgets and ensure that technology plans fit overall company direction. Committees comprise the top IS manager, financial officers, board members and chief executive officers. IS managers serve each of the three geographic regions, five business segments and 45 business areas.

Each business chooses its own applications, but ABB has standardized its office automation infrastructure. The company began rolling out Lotus Development Corp.'s

Notes 18 months ago. "We have one chance in a lifetime to standardize because it's something new," Skantze explains.

ABB now boasts 13,000 Notes users worldwide. "ABB is an interesting example of how companies can move, in this case to Notes, to build a global information infrastructure cutting through the national hierarchies," says Sean Phelan, an analyst at The Yankee Group in Watford, England.

Beyond that, some 1,000 staffers populate major IS centers in Sweden, Germany, Switzerland and the U.S. These centers house mainframes that handle host-based applications. For a chargeback fee, IS staffers also help install client/server systems for ABB companies.

Written by Marc Ferranti, IDG News Service bureau chief in Paris.

At a glance

ABB has 1,300 companies in 140 countries

Annual IS spending	$700 million
IS spending per employee	$3,390
Annual IS spending as % of revenue	2.5%
Number of IS employees	5,000

Source: Company reports for fiscal year 1993 and Computerworld estimates

Computer Corp. C4 supercomputers. Ford says the approach will trim product development time from 36 months to 24 months and save $3 billion to $4 billion starting with the 1999 model year. The firm also boasts worldwide purchasing and parts systems.

A sturdy backbone. If there's a single technical factor that CIOs say will power global growth, it's infrastructure. Indeed, belief runs strong that a solid technoskeleton of networks, systems, standards, people and processes can not only serve as a distributed cyberbrain of the wired organization but also act as trade routes for the global village.

Not surprisingly, top Global 100 firms are extending and improving their networks. United Parcel Service, Inc. is expanding its U.S.-based wireless radio network for worldwide use. Barclays is growing what it claims is Europe's largest virtual private network. Toyota's task is enhancing its global network.

It's paradoxical, but CIOs say such strong global frameworks enhance rather than restrict flexibility. The reason is simple: Applications and communications links can be created and deployed far more quickly using existing pipelines, platforms and

Today, Chase is counting on that strong backbone to speed roll-out of its new worldwide trading floor system. Phase one, 500 new seats in New York worth $95 million, was completed in March. London, Tokyo, Hong Kong, Singapore and Sydney will be linked, possibly via 100Base-T or Asynchronous Transfer Mode.

Strong infrastructure also opens the next frontier: linking suppliers with customers. Global firms are busy reinventing traditional channels using information technology.

For example, Ford plans to link Mazda Motor Corp. and other partners this year, Powers says. Deutsche Bank is expanding use of its international network for delivery of products such as money transfers, securities, derivatives and electronic banking, Gerard says. And Kao has created several systems for exchanging information with distributors, retailers and customers.

Big world, big problems. Despite impressive strengths, global leaders also face titanic headaches, including unfathomably complex integration, worldwide shortage of skilled IS labor, thousands of legacy applications and blurring technological change.

Yet outside factors may pose even bigger challenges. Laws governing transborder data transmission remain an inconsis-

Increasingly, technology bosses aren't technologists.

standardized components. That explains why companies in this group are rapidly adopting global standards for everything from architecture, information and electronic mail to LANs, software development tools, user interfaces and even desktop software.

Client/server and open systems also play key roles. Deutsche Bank, for example, is migrating 70,000 Nixdorf terminals and PCs to OS/2. Glaxo, which just named its first worldwide director of infrastructure, is switching from IBM mainframes to Hewlett-Packard Co.'s HP/UX and AIX. The world's second-largest drug maker is also standardizing on Oracle Corp. databases, TCP/IP and Microsoft Corp.'s Windows NT. UPS claims to be North America's largest client/server user, with 100,000 seats.

The common goal of such efforts? Better use of global resources. As Phillips' Mihm says, "We want any employee anywhere to access our enterprise technology." Or as John Handy, Glaxo's group information technology director, says: "The more effectively we can share ideas, the better we will work."

Toshio Hirasaka, director of Kao's systems development department, explains: "In the past, information only passed from top to down. Now we are trying to provide information to anyone."

That's the goal at Chase, too. Since the late 1980s, the financial giant has invested heavily in an integrated voice and data network that serves 50 countries. Novell, Inc. LANs are globally connected. Nearly every one of Chase's 29,000 PCs are linked to its new $80 million Metrotech Center in New York. Video-conferencing unites 30 global locations.

tent mess. During the next 18 months, global consortia formed by AT&T Corp., MCI Communications Corp., BT, IBM's Advantis unit and others plan to introduce new worldwide services. Analysts say convenient, reasonably priced global networks could erase many competitive advantages heretofore enjoyed only by wealthy megacompanies.

Ditto for the Internet. Most big, global corporations have a home page on the World-Wide Web but limit activity to advertising or providing information because of security concerns.

Edward M. Roche, a research fellow at the University of California at Berkeley who specializes in multinational electronic commerce, says the continued success of today's global corporations will increasingly depend on how well they adapt to the new "postglobal" era of virtual alliances and organizations.

"The big question is, how do you seize territory in cyberspace for your company?" Roche says. What counts most, he adds, is exploiting infrastructure — public or private, virtual or actual — to create the most effective means of making your company's information and services available.

Global CIOs recognize that the task is Herculean. Nike's Kreinberg acknowledges: "There is no finish line." 🌐

Toyota

Globalization has driven the auto giant to branch into the U.S. and Europe for manufacturing, R&D and suppliers

WITH AN EYE TOWARD integrating worldwide operations, information systems are helping Japan's No. 1 automobile exporter maintain quality and service as it transcends its Japanese origins.

"Toyota, operationally, is the most amazing thing on the planet," says James Womack, former research director of MIT's International Motor Vehicle Program and lead author of *The Machine That Changed the World.*

Toyota became "amazing" by continually improving and simplifying its manufacturing processes, not by overinvesting in computers or gathering data it could not use, experts agree. The company is careful to apply technology and information only where appropriate.

For example, the automaker has created for its engineers its own computer-aided design and manufacturing systems, which it sells through its Toyota Caelum, Inc. subsidiary. And to help car dealers provide better service, it has built applications such as the Lexus customer database, which lets any Lexus dealer access a customer's service records by satellite.

At the same time, workers at Toyota's factories and its suppliers' facilities still rely on cards, called *kanbans*, and other simple visual cues to trigger steps in the production process. It is no accident that a Toyota IS video begins: "It's necessary we select only the most important information for use in our business activities."

But globalization has affected Toyota's sense of what is appropriate and necessary. Because of pressure from Japan's trading partners and the strong yen, which has inflated the carmaker's costs, Toyota can no longer manufacture exclusively in Japan or rely on local Japanese suppliers that are used to the kanban method. The company now has factories in America and Europe; conducts research and development in California and Belgium; and imports American-made Camrys into Japan. And in North America alone, the auto giant has approximately 450 suppliers.

Where has a globalized Toyota placed its IS bets? For one, on global networks that enable Toyota to gather worldwide sales data, use it to forecast production requirements and transmit sequenced production schedules to suppliers. For another, on using electronic data interchange to supplement *kanbans* so Toyota's more distant suppliers can keep up with its just-in-time requirements.

"Our No. 1 task is enhancing our global network," says Kensuke Nagame, general manager at Toyota's system planning department and a three-year veteran at its Georgetown, Ky., plant. The network includes 6M to 12M bit/sec. links among the company's three main offices — Toyota City, Tokyo and Nagoya—as well as 64K to 6M bit/sec. digital connections to its major suppliers, factories and sales offices throughout Japan. AT&T Corp. provides frame-relay data links between the U.S. sales organization and its Tokyo office, while Mercury Communications Ltd. and Belgacom provide links to Europe.

Toyota plans to connect its U.S. suppliers to its network and is giving serious consideration to upgrading its network to multimedia capability. One possible application is multimedia catalog car sales in Japan. The automaker is also considering expanding its network into Asia and selling cars via the Internet.

● **Toyota's Kensuke Nagame:** *"Our No. 1 task is enhancing our global network," which now links the company's three main offices as well as connecting to suppliers, factories and sales offices in Japan*

At a glance

Toyota has facilities in more than 20 countries

Revenue	$94.6 billion
Profit	$1.27 billion
Annual IS spending	$35 million*
Number of IS employees	1,026

Source: Company reports for fiscal year 1994 and Computerworld estimates
*Does not include factory automation or wages and salaries, which would increase this figure significantly

Ⓒ Written by Allan E. Alter, a Computerworld USA senior editor, and Rob Guth, an IDG News Service correspondent in Tokyo.

A Global Challenge

AS COMPANIES ADOPT A GLOBAL APPROACH TO BUSINESS, IS managers need to prepare for a new set of challenges. To graduate from multinational to global status, a company must change technical infrastructures and work processes.

IS executives should be prepared to adopt a sophisticated mix of flexibility and structure for the transition. The same sort of contingent approach to information technology strategy — moving from a one-size-fits-all method to recognizing the individual needs of business units — that has enabled organizations to achieve superior alignment between technology and business is even more valuable when a company is driving a globalization effort. For many reasons, IS executives should develop a strategy and a governance structure that balances the needs of the enterprise as a whole with the needs of local units.

There are many fundamental differences among locations that must be accommodated by IS services and products, including time zones, languages, regulatory environments and basic technical infrastructures. A successful strategy accommodates these differences.

That's one reason why any globalization effort demands new levels of communication. More than ever before, an organization's information technology infrastructure must be prepared to support effective enterprisewide communication. This is a key role for IS. Those organizations that have already laid the groundwork for a standard infrastructure have a distinct advantage.

Some organizations have the resources to literally rise above these challenges by using satellites in their communications systems. With a proper telecommunications architecture in place, organizations will find it much easier to leverage on a global scale many of the same practices that have allowed them to maximize domestic technology investments.

For example, one company might take advantage of the time zone difference between its East Coast data center and its Asian operating units, handling all processing from the East Coast during off-peak hours. This not only enables the company to close an Asian data center but actually improves response time.

A well-designed and properly implemented communications infrastructure not only enables companies to adopt best practices and tap new labor markets but also facilitates the kind of ongoing dialogue that is essential to keep far-flung business units aligned with the enterprise mission. Without an active dialogue, outlying units can become resentful of a corporate direction they feel is being imposed on them, and headquarters may adopt approaches that are ill suited to local realities. Companies must communicate effectively if knowledge transfer is to occur on a global scale.

However, strategy and infrastructure only take you so far. To go the distance, be prepared to travel a lot. Many IS executives spend so much time on the road coordinating global information technology activities, their home offices are constantly empty.

Information technology is at the heart of an enterprise's ability to adopt a global approach to business. That means IS executives can count on adding a new layer of complexity to their already demanding positions. But there are benefits as well. Because information technology is a key enabler to this dominant business trend, IS executives are in a position to create new alliances, refine their entrepreneurial skills and demonstrate to senior management that they can deliver the services and products that drive global success.

Mary Silva Doctor

Mary Silva Doctor
Ernst & Young, Boston

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Public Sector

TO SAY THAT PUBLIC SECTOR IS ORGANIZATIONS AROUND THE WORLD ARE STRETCHED THIN THESE DAYS would be something of an understatement.

Governments and other public sector organizations are knocking on information systems doors for help in increasing the efficiency and reducing the cost of operations. And if this isn't challenge enough, these groups are also enlisting their IS shops to expand government services to an increasingly demanding citizenry.

The IS departments, of course, are being asked to do all this within austere budget environments. The *Computerworld Global 100* includes several organizations, profiled below, that have managed to deliver, despite the demands they face.

Metropolitan Toronto Police
Toronto, Ontario, Canada

IN THE LAST TWO YEARS, the information systems department of the Metropolitan Toronto Police has saved the force $21.3 million in cost savings, cost avoidance and increased productivity, says Roger Mahabir, director of computing and telecommunications.

That's a far cry from IS's track record prior to 1992, says Inspector Bill Blair, an 18-year Toronto Police veteran. Then, officers were hindered by a system in which records were badly sorted and information was often misplaced.

"We are essentially an information gathering agency, and we were doing a very poor job," Blair says. "We were collecting the same information over and over, in various states of completeness. In trying to get a clear picture, you'd come up with conflicting things or partial information."

Mahabir was hired in 1992 to turn things around, Blair says. Since then, the force's IS department has migrated many of its applications from its Unisys Corp. A16 dual-processor mainframe, which used approximately 700 dumb terminals and first-generation workstations, to 70 interconnected Ethernet LANs employing 60 IBM RS/6000 servers linked to more than 4,000 clients, which include IBM PS/2s and mobile dumb terminals used in police cars. Some applications still reside on the mainframe, which continues to function as a data warehouse.

Dubbed Metropolis, the new system handles functions such as computer-aided dispatch; centralized occurrence processing; integrated computer imaging, including a database of mugshots; and criminal information processing.

The improvements in IS efficiency are also helping make Toronto safer by freeing beat police from administrative tasks and allowing them to do "more community-oriented, problem-solving policing," Blair says. — *Peter Wolchak, Computerworld Canada*

Information and Decision Support Center
Cairo, Egypt

FOR EGYPT, INFORMATION TECHNOLOGY has become more than just a means of improving operating efficiency. It has become a mission to bring the country into the 21st century. At the forefront of Egypt's drive to computerize is the Egyptian Cabinet's Information and Decision Support Center (IDSC), formed in 1985 not only to design and implement the Egyptian government's technology and decision-support infrastructure but also to develop a software industry and high-tech industrial base.

While the IDSC is moving to client/server applications, downsizing and off-loading applications from its IBM ES/9000 Model 260 mainframe to Unix-based workstations, it is also moving older technologies such as Intel Corp. 80286 PCs and DOS-based applications to areas of the country that are not yet computerized.

Topping the IDSC's list of significant information technology projects are the following:

Not all that glitters is in the private sector.
Some governments have harnessed the power of IS.

• **The Debt Management Project**, a management information system to monitor and analyze Egypt's debts.

• **The National Budget Project**, a national budget database with fiscal analysis tools.

• **The Customs Reform Project**, a decision-support model to help a comprehensive tariff structure in 1986.

• **The Legislation and Decrees Project**, a database of all legislation and decrees issued by the Egyptian government since legislation was first passed in Egypt in 1824.

• **The National Security Number Project**, one of the largest multimillion-dollar data-entry projects in the world, designed to automate the production of identity cards and other official government documents for Egypt's 60 million citizens. — *Cheryl Hohenstein Wafai, Computerworld Middle East, Egypt*

Japan Finance Corp. for Small Business
Tokyo, Japan

WITH THE AID OF A client/server system, the Japan Finance Corporation for Small Business (JFCSB) has re-engineered the role of the banker from loan officer to business consultant.

JFCSB helps insure that Japan's small to mid-size businesses receive the long-term financing they need to grow, even when it's difficult for them to obtain credit from commercial banks.

Until last year, JFCSB's 1,200 bankers could do little more than shepherd applicants through the loan process. Now the Relationship, Intelligence, Proposal system provides JFCSB bankers with three kinds of information they can share with clients, say JFCSB officials and Tokyo University Prof. Yutaka Umezawa:

• **Sharing experience.** Using electronic mail, bankers can solicit practical suggestions from colleagues whose clients have had similar problems. This information is gathered into case studies and filed in an "electronic cabinet" for future reference. More than 300 case studies have been stored so far.

• **Benchmarking.** JFCSB's client database, which contains more than 100 information fields, can be used to help any client compare its costs and performance against the agency's 50,000 clients.

• **Matchmaking.** JFCSB can match clients that are opening new factories or moving to new facilities with suitable suppliers and vendors in their new location. — *Allan E. Alter, Computerworld USA, and Rob Guth, IDG News Service, Tokyo*
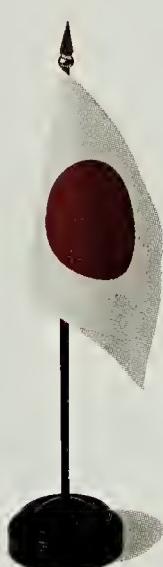
Inland Revenue Department
Auckland, New Zealand

SINCE THE MID-1980s, New Zealand has moved away from being one of the most highly regulated economics in the world. As a result, its government agencies are learning to be more flexible. This was difficult for the Inland Revenue Department (IRD), given its outdated technology, including a more than 20-year-old Cobol-based system with a Goods and Service Tax system developed in Linc 4GL.

In 1988, under the aegis of then-Commissioner of Inland Revenue David Henry, the department proposed a plan to modernize its computer systems and reorganize business processes. Andersen Consulting helped implement the $128.6 million project, known as the Future Inland Revenue Systems and Technology, or FIRST.

The IRD selected Sun Microsystems, Inc. to provide about 240 network servers as communications devices for its wide-area network. These serve 500 PCs and terminals and about 800 terminal devices. There are about 2 million machine transaction inquiries per day, with an average mainframe response time of two seconds or less. FIRST is due for completion in March 1996.

Information technology "will go hand in hand with the business drivers," says information systems manager Peter Joneleit. — *Randal Jackson, Computerworld New Zealand*

Department of Social Services
Lansing, Michigan, USA

FOR THE Michigan Department of Social Services' 14,000 employees, "the workload is very high, there are enormous amounts of paperwork, and the policies they have to apply are extremely complicated," says Norm Charles, the department's chief information officer.

Most of these employees are in the business of delivering services or determining eligibility for the state's Aid to Families with Dependent Children, Food Stamps, Medicare and other programs. Charles oversees the systems that determine recipient eligibility, track cases and process payment.

The Department of Social Services is in the midst of a sweep

ing overhaul of its information technology infrastructure. The department's plan is to replace its centralized data processing structure with a three-tiered architecture of mainframes, Unix-based departmental servers and PCs. The workstations will manage communications between the central mainframe and the regional offices and will also provide local applications processing.

Key applications such as eligibility and payment processing are being re-engineered to run in the distributed environment.

Charles says he believes the new system, slated for completion in 1997, will boost productivity, reduce errors and help employees provide "infinitely better service."

The department plans to invest $120 million in the project over three years, but Charles says the information technology expenditure will yield $80 million to $90 million in annual savings. Much of that savings will come from improved accuracy in determining eligibility and processing payments. — *John Moore, Federal Computer Week, USA*

Department of Information Services
Olympia, Washington, USA

FACING INTENSE BUDGET pressures, Washington State's Department of Information Services is using information technology to create some innovative citizen programs.

While generally in the business of providing services to 147 state customers, last year the department helped develop information "kiosks" in cooperation with IBM and 19 state and federal agencies. The kiosks will directly provide the public with a range of services.

With the Washington Information Network, launched in August 1994, Washington joins a handful of states that have deployed kiosks in the front lines of citizen service. Washington's program has 10 permanent kiosks and one floater that rotates among shopping malls and other public areas, according to George Lindamood, director of the Department of Information Services.

Each kiosk offers 42 applications, including job listings, student loan information and data on vehicle registration and licensing procedures. The most popular application so far is a job search service provided by the state employment department.

Lindamood also plans to help state agencies link their isolated PCs and adopt a standard suite of end-user applications that would include electronic mail, scheduling and Internet access.

"We are encouraging agencies to put information up on our Internet server," Lindamood says, "to give citizens direct electronic access to government information and services."

The department's public and internal advances, however, have come on the eve of a major budget squeeze that is scheduled to take effect at the beginning of the state's fiscal year in July.

To maintain its level of service, the Department of Information Services has proposed to the state legislature that it become a not-for-profit corporation. "That would take us off the balance sheet [and help us] depoliticize information services," Lindamood says. — *John Moore, Federal Computer Week, USA*

Island of Automation

EVEN DISCOUNTING ITS SMALL SIZE, 225 square miles, the island republic of Singapore boasts an impressive information technology infrastructure. As early as 1981, Singapore's government recognized that investing in information technology would attract foreign business and distribute government services.

That's the year Singapore created the National Computer Board (NCB) to oversee the nation's information technology strategy. One of its first tasks was to implement the Civil Service Computerization Program. Under the program, all of Singapore's ministries and state agencies have been computerized, with more than 100 mainframes and minicomputers and more than 10,000 workstations.

A decentralized reporting structure helped the NCB develop systems quickly, says Goh Kiat Soon, senior director of the NCB's Government Systems Division. And the NCB is getting everyone to use electronic mail to create user enthusiasm for the systems. The E-mail application sits on top of the InterDepartmental Network, the information infrastructure for the civil service agencies, Goh says.

NCB is also exploring new infrastructure technologies, such as Asynchronous Transfer Mode (ATM), says Wong Joon Tai, information systems manager at the Education Ministry. "We may consider 100M bit/sec. LANs as a starting point, but for WANs, that will depend on ATM's availability and cost," Wong says.

Goh says partnering with the private sector lets the government take advantage of technologies that exist in the marketplace. "What we develop are specific applications for each ministry," he says.

Singapore Network Services, a network provider that connects the private sector with government departments, works closely with the NCB. Using lines from Singapore Telecom, Singapore Network Services provides electronic data interchange (EDI), E-mail and database services, says Chan Kah Khuen, deputy managing director at Singapore Network Service. He says that by midyear, it should have an interactive EDI system in place that will let importers and exporters submit documents electronically.

"The response time [using EDI] is about 15 minutes, compared with one to two days under the manual system," Chan says. Singapore Network Services hopes to cut that to two or three minutes, he adds, to "maintain a competitive edge over other network operators in the region."

In spite of service improvements like this, there is no time to rest on one's laurels, Goh says. "Today's needs have been met. But tomorrow's? We'll always have to improve ourselves for the future," he says.

— *Written by Solomon S. Emanuel, a staff reporter at Computerworld Singapore, with contributions from Gerald Wee, editor of Computerworld Singapore.*

HARMONIC CONVERGENCE

More important than investing in the latest hardware, Japanese companies look for technology that fits the way people work

By **Allan E. Alter**
and **Rob Guth**

The Japanese make a distinction between *tatemae* and *honne*. Roughly translated, it's the difference between how things appear on the outside and what is really going on inside. It's a useful distinction to make when you look at the state of information technology in Japan. From the outside, Japanese businesses can appear behind the times in their use of information

technology. Visit any major corporate office in Japan and you will spot fewer PCs or workstations than you would in the U.S., even in the systems development department at a major bank. Studies show that PC use is relatively low in Japan, and few Japanese PCs are networked. Users frequently share PCs, and big iron still dominates.

Counting PCs, however, misses the point. Most of the Japanese companies on the Global 100 list have created large, highly integrated information technology architectures to operate their businesses. Computer magazines are increasingly displacing comic books as subway reading for young salarymen. And information systems managers at a number of companies now list Internet addresses on their business cards.

Seeking harmony. The *honne* of Japanese IS really shows in the names Japanese companies give their information systems, which may contain words such as "relationship" and "harmonize." One example is NSK Ltd.'s Challengers, which stands for Carry and Harmonize All Enlarged NSK Global Enterprises through Real-time Systems.

These systems reflect Japan's distinctive approach to IS. In a society where greeters bow to department store shoppers, car salespeople make house calls and face-to-face contact is considered crucial to getting anything done, Japanese companies use computers to enhance and support human relationships rather than replace them.

"We are not making computer systems but man/machine systems," says an IS manager at The Dai-Ichi Kangyo Bank Ltd.

Consider Japan's approach to the automated teller machine (ATM). ATMs can complete cash transactions in as few as eight seconds and are routinely used to pay bills or

debts to family and friends, says Shin Takeuchi, general manager of the systems administration department at Nomura Research Institute Ltd. Yet they shut down during evenings and weekends, require personnel to oversee them and have telephones so customers can call a bank teller. The reason: Japan's ATMs were conceived as extensions of, not replacements for, tellers.

Toyota Motor Corp., for example, keeps technology and people in balance by relying on simple processes and ways to communicate (see page 19).

The search for harmony extends to Japan's approach to business process re-engineering. Unlike the West, Japan's re-engineering experience has not become completely identified with head-count reductions.

To be sure, Japan's protracted economic downturn and the devaluation of the U.S. dollar are forcing many Japanese companies to slough off employees through retirement and relocation schemes. However, early attempts to slim middle management, such as Pioneer Electronic Corp.'s retirement plan in 1993, were met with public outcry. Companies are under intense pressure from the Japanese public to cut costs without cutting people.

Even Japanese companies that are replacing employees through computerization are "carefully searching for a harmo-

Tokyo Electric's Minoru Yoshikawa hopes E-mail can improve information sharing

Tom Wagner - Saba

In a society where car salespeople make house calls, Japanese firms use computers to enhance and support human relationships

nious balance between the need for introducing more computers and reducing the numbers of workers in the workplace," says Kuniaki Takamatsu, executive director at the Japan Institute of Chief Information Officers in Osaka.

Some organizations have a different approach to re-engineering: Re-engineer value into their people. The "Relationship, Intelligence, Proposal" system developed by the Japan Finance Corporation for Small Business (JFCSB) is one example of employee-friendly re-engineering, says Yutaka Umezawa, an economics professor at Tokyo University (see story page 23).

JFCSB's system gives its bankers information that enables them to act more like business consultants. Yet the customer never sees or accesses the system; JFCSB's bankers take computer printouts to the customer's office and work face to face. As a result, the system strengthens the personal bond between banker and customer. "The most important thing is not to make the machine more clever but to take the banker to a higher level," says Ken Takeuchi, executive director.

Misumi Corp. has taken another approach, which is to minimize the need for staff in the first place to better avoid staff reductions. With 200 employees (including an IS staff of 11), the Tokyo-based trading company handles auto and consumer electronics parts orders from 27,000 customers, says Hirobumi Inokuma, an executive director at Misumi. This often means making tough decisions, such as to use an on-line service instead of an in-house network for exchanging information within the company's head office. "Once we install a LAN we have to support it, and besides, the cost [of the service] is cheaper," he says.

Japan's most innovative companies go the extra mile to gather customer feedback. Kao Corp., a personal care products company, uses IS to share and gather data in ways that strengthen its relationships with distributors and consumers.

Because it could not "see the face" of its customers using com-

plex, conventional distribution channels, Kao bypassed those channels by creating 10 *Hansha*, which are independent wholesalers that distribute only Kao products, says Toshio Hirasaka, director of the systems development department. Today, IS helps these companies support and exchange information with retailers. *Hansha* sales advisers provide that necessary personal contact with store managers.

Kao's Echo system also connects with consumers by providing information and gathering data on the 40,000 callers who contact Kao's toll-free lines each year. Kao staffers also conduct door-to-door surveys of customers.

Office computing is one area where disharmony between computers and people still exists. Minoru Yoshikawa, general manager of the information systems department at Tokyo Electric Power Co., has become interested in electronic mail because it promises to "eliminate unnecessary midlevel management work," lower labor costs and improve data sharing, even though the utility's staffers work in traditional Japanese fashion: in long lines of desks facing one another. The company already has 8,000 terminals communicating by E-mail.

But E-mail raises cultural issues. For example, to achieve consensus, managers circulate reports on paper and affix a personal seal to mark their approval. "You need to get approval with the seal to feel safe," says one member of Yoshikawa's staff. He wonders how that would work with E-mail.

Members of Japan's IS scene are often critical of computer vendors, older executives who don't understand computers and the state of PC use. The need to reduce costs is evident. But given the determination of the Japanese to recover from the recession and their knack for combining people and technology, as well as their insight into using information systems to strengthen human relationships, outsiders shouldn't underestimate Japan's IS by taking Japanese self-criticism at face value. 🌐

Kao's Toshio Hirasaka: Kao created wholesalers so it could see the faces of its customers

⟲ ALTER IS A COMPUTERWORLD USA SENIOR EDITOR. GUTH IS AN IDG NEWS SERVICE CORRESPONDENT IN TOKYO.

Japan's New Model

JAPAN'S IMAGE TO THE WORLD AND TO ITSELF is that of a slow-changing, tradition-bound nation. The status of information technology in business matches that image. This perception, however, is not entirely accurate. Japan has experienced short periods of turbulent change in its long history, such as the reindustrialization after World War II and the leap to global leadership in consumer electronics in the 1970s and 1980s.

Now the country is poised for another burst of rapid change, enabled by information technology and led by two revolutions: the deregulation of Japan's retail industry and the aging of the workforce.

Deregulation is creating a class of entrepreneurial companies that are raising expectations for value and customer service. Meeting these expectations will provide the creative energy for rebuilding Japan's cumbersome distribution chain. Japanese business will develop industrywide standards for sharing information, multicompany networks and real-time delivery of information to front-line employees.

The aging of Japan's workforce dooms its lifetime employment system. For much of corporate Japan, the cost of carrying an overhang of middle-age managers represents the difference between profit and loss. Tasks such as data collection and analysis and internal coordination and communication will be either replaced by technology or performed by employees supported by information technology.

As a result, a new economic paradigm is emerging that replaces the machine icon with the organism. Before, business was supposed to possess machine-like predictability based on a standardized mass market. This assumption allowed for centralized accumulation and analysis of information and the installation of standardized procedures. The model drove Japan to superstardom but left an undesirable legacy: strategic planning staffs with lots of power, rigid operating procedures, high costs and little customer responsiveness.

Now, using the organism as the model, variation, adaptability, uniqueness and unpredictability will be encouraged. Responsiveness and flexibility will become competitive advantages, local initiatives will be rewarded, and coordination and communication will be direct. Information technology will provide the nervous system for this new business organism.

Of course, these changes will bring upheaval. Instead of being guarded by a bureaucracy and controlled through seniority, information will become fluid and ubiquitous. This will bring authority to those employees who are in close contact with customers.

It has taken the U.S. several decades to work through these changes. However, the Japanese have advantages that will help them move more rapidly. Japan's emphasis on speed, quality and teamwork as well as its tendency to take a long-term, holistic view of business will work in its favor. In addition, Japanese business's proven ability to focus intensely on a key strategic issue means that once action is decided on, it will be carried out.

All of this has implications for the rest of the world. New organizational and technological models will emerge in Japan from which others can adapt and learn. Expect to see renewed competition from the Japanese, not only in computer hardware and heavy manufacturing but also in the service and software arenas — areas in which they've been laggards.

Non-Japanese firms can look for opportunities to provide the know-how for these dramatic changes as Japan wires itself for the 21st century.

Belden Menkus
CSC Index, Inc., Tokyo
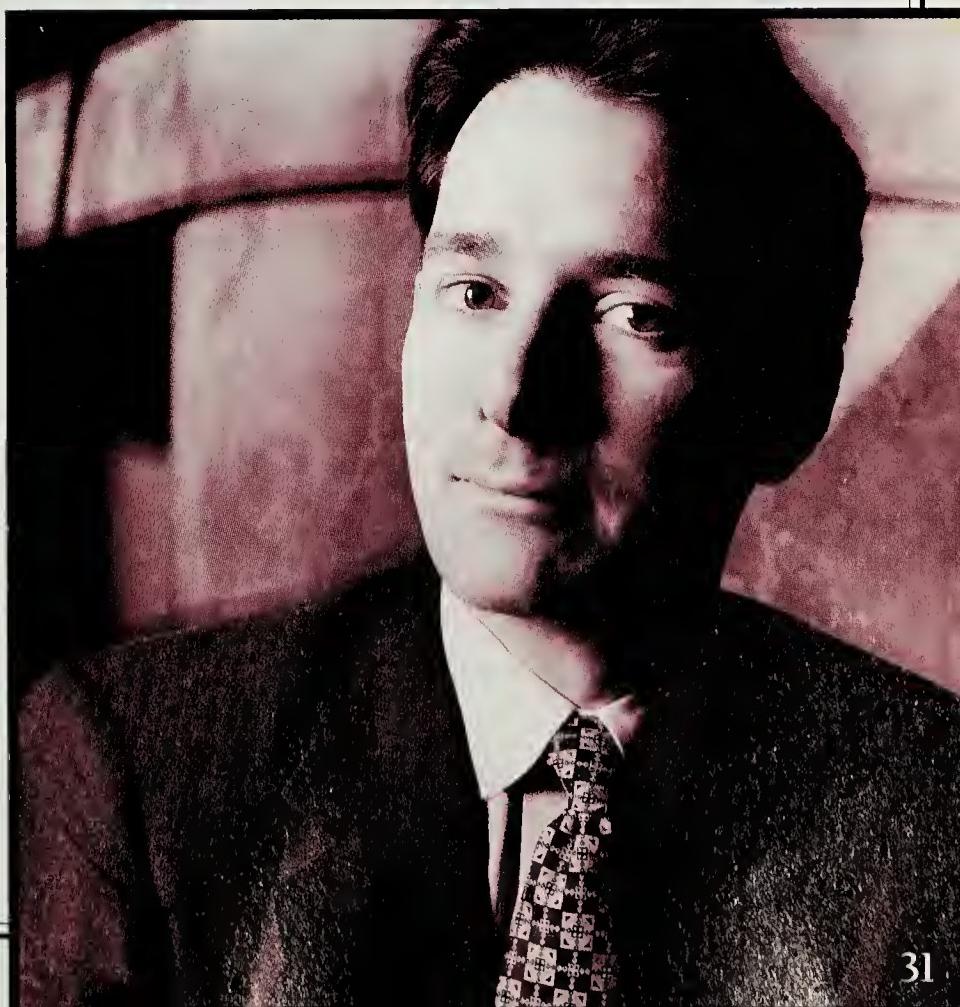
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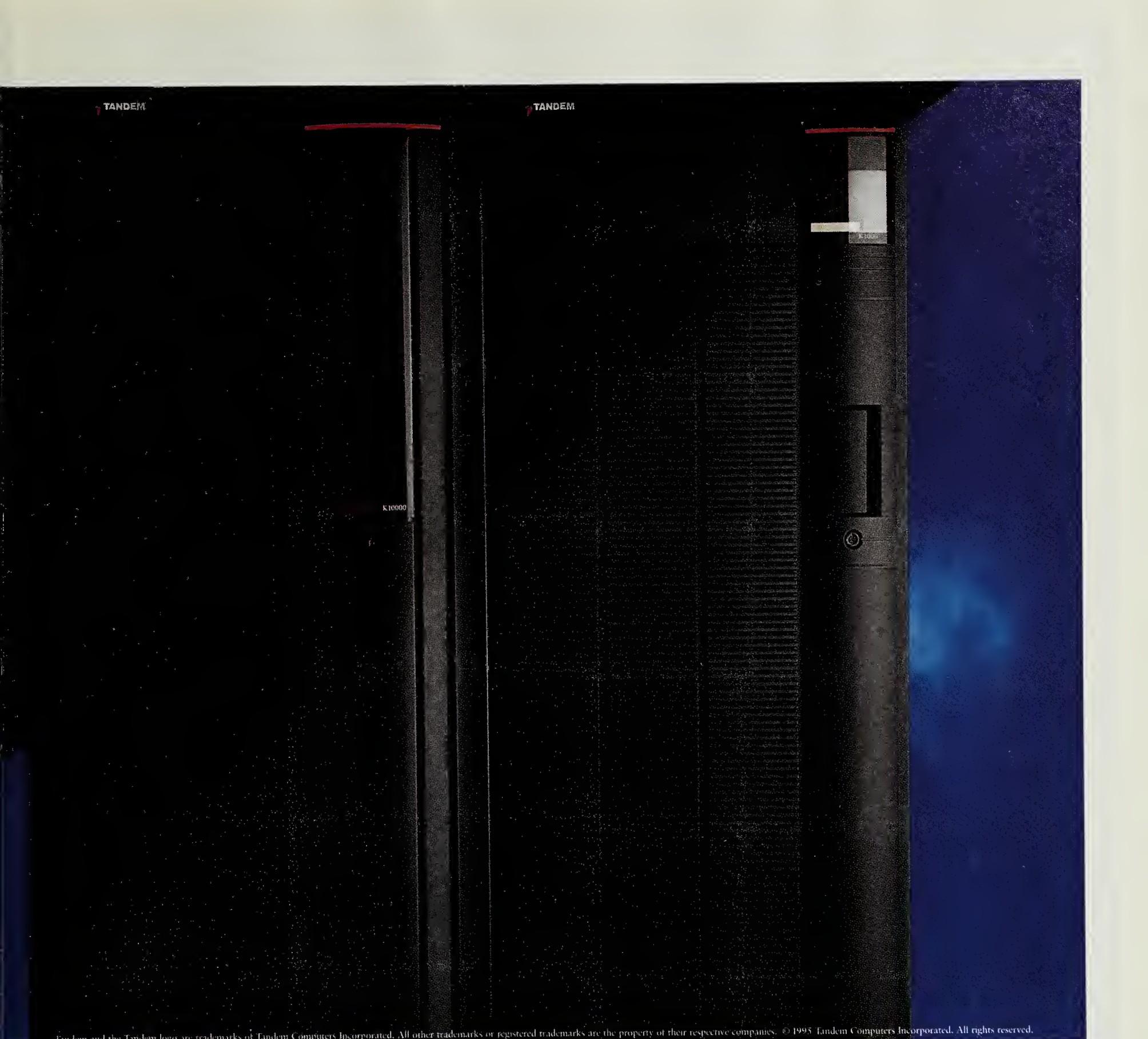
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Border Crossings

Western Europe

By **Marc Ferranti** and **Cara Cunningham**
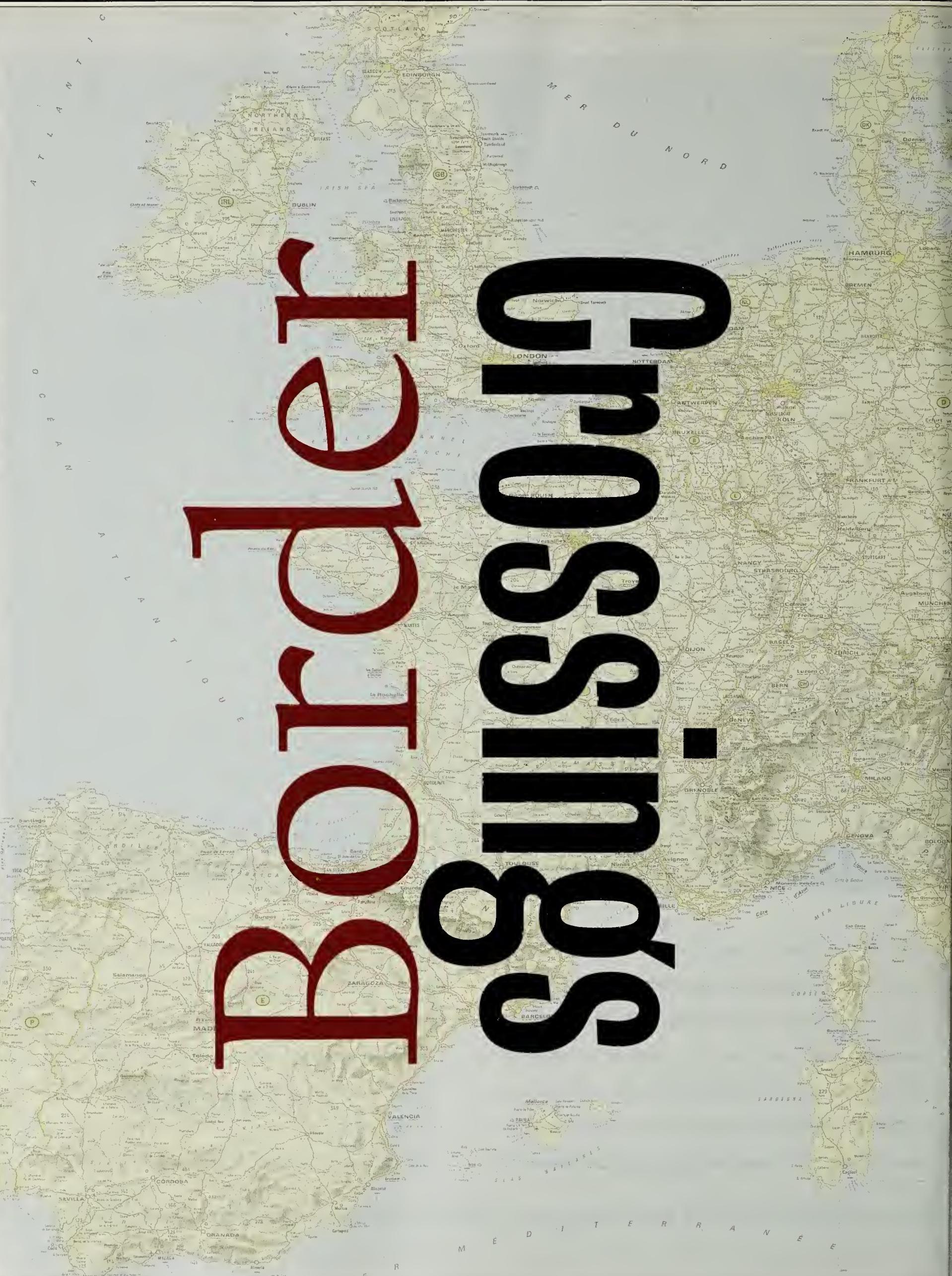
D ESPITE EUROPE'S MOVEMENT TOWARD TELECOM LIBERALIZATION and a single currency, it remains for the near term a conglomerate of disparate markets. Optimism for a "borderless" Europe is not high, says Josée van den Berg, business development manager at International Data Corp.'s Network Expertise Center in Amsterdam. National politics continue to play an important role in preventing a truly borderless market. For example, though European Union rules say approval of a product by the European Telecommunications Standards Institute in one nation allows that product to be sold anywhere else in the union, in practice, different nations still require their own testing against the institute.

U.S. network vendor 3Com Corp. is challenging the practice, under which companies must go through physical inspections that can take four to six months in each country.

Many of Europe's top businesses, such as electrical engineering giant ABB Asea Brown Boveri Ltd. in Zurich or Deutsche Bank AG in Frankfurt, grew to their current size through mergers with firms in other countries. As a result, in the late 1980s and early 1990s, they were left with heterogeneous computing environments — different operating systems, hardware platforms and software — unconnected by underlying data and telecom infrastructures.

Laying a computing infrastructure to achieve efficiencies of scale involves making decisions on issues such as standards, outsourcing and centralization vs. decentralization. These issues can present big headaches when crossing borders.

This was the problem faced by Paris-based Europcar International SA.

Following a series of acquisitions, which culminated in 1989 with the merger of Europcar and Frankfurt-based Interrent Autovermietung GmbH, top management at Europcar realized the inherited hodgepodge of reservation networks across Europe would not support the company's growth. Nor would it allow the company to compete effectively with rivals Avis, Inc. and Hertz Corp.

Faced with a patchwork of information systems groups at its nine European subsidiaries, Europcar to outsourced its autonomous national IS groups in 1991 to integrator Perot Systems Corp. The contract includes developing and maintaining an integrated reservation, financial and fleet-tracking system.

"After the recession of the last few years, companies are focusing on their core competencies," says Glenn Cuthbertson, vice president and research director of IS management at Gartner Group, Inc. in Windsor, England.

Kvaerner A.S. in Oslo has also decided to focus on what it knows best: ship building, pulping, mechanical engineering and equipment manufacturing for the off-shore oil industry. It is limiting the development of advanced in-house information-warehouse expertise by outsourcing its planned Kvaerner Internal Global Area Network to an international network vendor, says project manager Per E. Fagerlund. Negotiations are under way with two short-listed alliances: AT&T Corp./Unisource and BT/Telenor International.

The $3.5 billion Kvaerner, which is investing up to $90 million in research and development, is supported by a global high-speed network that will connect its worldwide sites with bandwidths up to 8M bit/sec. The result will be a regional frame-relay information highway with dynamic bandwidths from 32K to 128K bit/sec. connecting the company's main sites in Europe and Asia.

Industry insiders maintain that it makes sense for firms downsizing IS staffs, focusing on core competencies and outsourcing data communications to go with the national monopolies within country borders and international service providers outside borders such as Sprint Corp., Eunetcom SA in Paris or Unisource in Hoofddorp, the Netherlands.

But even for companies that outsource the construction and maintenance of their datacom infrastructure, telecom

A borderless Europe is a nice idea, but it's not reality. National regulations complicate the building of a Pan-European IS infrastructure.

infrastructure isn't hassle-free.

Pharmaceuticals giant Glaxo Holdings PLC, for example, has outsourced its virtual private network to Sprint. "Western Europe is relatively easy," says John Handby, group IS director at London-based Glaxo. But the quality of lines in Eastern Europe is poor, he added, so Glaxo lets Sprint build the network throughout Europe.

"Even so, you can't switch your brain off and not worry about it — you have to get involved," Handby says. "All the big communications service companies claim to offer worldwide services, but none of them are as global as they claim."

Some firms with communications expertise decide to create their own centers of expertise. Technically, establishing a telecom and datacom network is no harder in Western Europe than in the U.S., IS managers say. But national politics complicates it.

"There are no technical obstacles to data transport at the level of interconnections, but there is the cost associated with the old-style telecoms because we still have to obey legal restrictions," says Rudolf Marty, IS applications development manager at Zurich-based Union de Banque Suisses.

"The liberalized laws will make it less expensive because we are not able to provide services to others now," says Hans Eisele, chief executive officer at Swissair Information Systems, a business unit of Swissair Ltd. in Zurich. The company has extra capacity for voice, for example, but is only permitted to use it for itself, he says. Swissair has a highly centralized IS structure that offers networking, systems integration and airline industry-specific technology services.

Not only are Swissair's IS centers profit centers, but the firm also extends its services to external companies and some 130 to 150 Swissair offices worldwide. "In 1991, we made the decision that we had to extend service to third parties to sustain the necessary growth and volume," Eisele says.

For Swissair, it is still a matter of taking advantage of a core competency. "Our reputation is very good on the reservation system side, and we supply software licenses to airlines that can't afford to maintain large IS staffs," he says.

Helping Swissair traverse the globe is the fact that it is focused on a single industry. And though it recently acquired majority positions in Swiss carriers CrossAir Ltd. in Basel and Balair CTA Ltd. in Geneva,

Watford, England, "because even though telecom costs are high, supporting many IS staffs in geographically dispersed locations may be even higher."

Centralizing data centers saved Deutsche Bank hundreds of millions of marks, says Peter Gerard, executive vice president. "Currently we are on the way to run only two logical

eause of variances in global banking, Marty says.

Increasing uniformity of business practices, monetary system and liberalized telecom and technology approval laws will undoubtedly promote technology standardization. But how quickly that happens is out of IS managers' hands.

"We need the political will

Swissair was not built up out of a hodgepodge of local companies as was Zurich neighbor ABB (see story page 17).

"Companies may find it less costly to move their total IS staff into several centralized IS centers and provide support over their network infrastructure," says Sean Phelan, a network analyst at The Yankee Group in

computing centers based on five locations worldwide."

Some firms can maintain a decentralized business strategy and achieve enterprisewide efficiencies by setting standards in limited areas. Though Union de Banque uses companywide risk assessment and options systems, it is decentralized for most banking applications be-

to change, but we will in any case continue to cross borders for sound economic reasons," van den Berg says. 🌐

EU Commissioners in Brussels are taking the lead to liberalize Europe's telecommunications

Long Journey to a Free Market

With telecommunications liberalization, as in other aspects of life, the devil is in the details. Though the European Union (EU) has agreed in principle to liberalize voice communications and telecommunications infrastructure by 1998, technical and political arguments are still unresolved.

The 1998 milestone, when any company will be able to offer telecom services and even lay its own cable, is key to a truly free market because widespread anomalies still exist across Europe.

"Though data transmission services have already in theory been liberalized, the service providers are at the mercy of the national monopolies because only the national monopolies have control and can rent out infrastructure," says Sean Phelan, a network analyst at The Yankee Group in Watford, England.

"In Italy, the situation is murky," says Lorenzo Molina, an analyst at International Data Corp. in Milan. "Although EU law has liberalized data transmission services, Telecom Italia has refused to let service providers use its infrastructure because national regulations have not yet incorporated EU laws."

The Italian Anti-Trust Authority earlier this year ruled for Telsystem SpA, a service provider in Milan that brought a suit against Telecom Italia in Rome for refusing to rent infrastructure. Telecom Italia is appealing the verdict. Also, the EU excused Portugal, Greece and Spain from the 1998 deadline, though Spain has said it will be ready.

— Written by IDG News Service's Brussels correspondent Elizabeth de Bony and Paris Bureau Chief Marc Ferranti.

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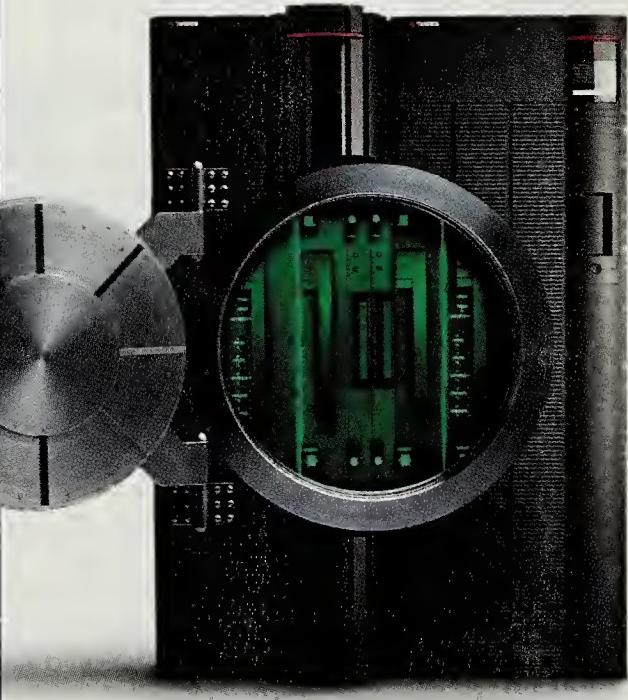
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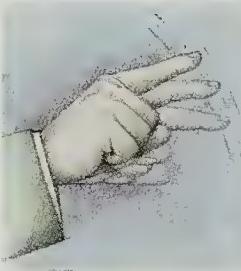
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Spinning Europe's IT web

LATER THIS YEAR EUROPE'S BIGGEST TELECOMMUNICATIONS COMPANY, Deutsche Telekom, will be privatized. Owned by the German state and serving some 37 million customers, it is one of the country's biggest employers. Its sale will be the single biggest share issue in German history. In the run up to privatization, Deutsche Telekom has streamlined its internal operations dramatically and — no coincidence — implemented one of the most extensive Unix-based information technology infrastructures to be found anywhere in the world.

The fact is, public utilities across Europe are in the throes of fundamental change as they are transformed from state bureaucracies into customer-focused commercial operations. It is hard to exaggerate the impact of this re-engineering shift, and it is one in which information technology plays a pivotal role.

In essence, the issues are clear enough: Competitive circumstances demand big improvements in service quality and customer focus and big cuts in operating costs. These changes, in turn, imply wholesale internal reorganization, staff layoffs and, perhaps the biggest challenge of all, the encouragement of customer service cultures.

Remarkably, many of these historically protected organizations have grasped the nettle. They are attempting to recreate themselves fundamentally, and their efforts represent some of the most ambitious change programs ever undertaken in Europe. There is a sense, in fact, that they are making a virtue of necessity and going for quantum change in performance rather than incremental improvements.

This spirit of meeting challenge head-on is most obvious in technology investment. For example, one of our clients, an Eastern European railway company, has over the years compensated ingeniously for its lack of access to Western technology. Now it is implementing one of the most advanced goods transport systems in the world. It has jumped three generations in as many years.

It should come as no surprise that so many of these utilities have replaced their old mainframe-based command and control systems with technically ambitious client/server architectures. For utilities, client/server technology is proving a key enabler of radical shifts in organizational culture and business processes, such as empowering front-line workers to make their own decisions.

This approach is most conspicuous in customer service, where it enables utilities to develop customer service centers that exploit the latest computer telephony integration and offer a single point of customer contact.

This transformation of Europe's utilities is throwing up hard information technology lessons, some of which are technological. Client/server infrastructures and distributed computing present IS managers with serious control issues, which have exposed the dearth of systems integration and systems management tools we have long taken for granted in the mainframe arena.

While this re-engineering has underlined information technology's contribution, it has also demonstrated its limits. The new technology is necessary but insufficient; it must be applied hand in hand with business process change.

Change management requires proper investment and planning that follows the same rigor as systems delivery. The organizations that successfully manage the people and process change will reap the most value from their technology investments.
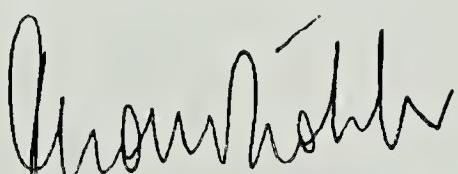
Thomas Köhler
Andersen Consulting, Frankfurt

Out of the

The industrialized North may consider the Southern Hemisphere a technology backwater, but don't tell that to these IS leaders

THE NORTHERN HEMISPHERE MAY REGARD itself superior, but it could learn a thing or two from its neighbors down under. For one thing, information technology leaders in the Southern Hemisphere understand change — big change. From four-digit inflation in Brazil to the end of apartheid in South Africa to deep recession in Australia, survival south of the equator depends on a company's adaptability.

South African companies have probably endured the most wrenching change in the past few years. Not only are they being forced to rethink how they address their markets, but they also must review their own staff recruitment and development plans. At the same time, companies must adapt to changes in corporate legislation governing taxation, labor relations, social responsibility and computer technology.

The lifting of trade sanctions has brought many leading information technology suppliers, including IBM and Microsoft Corp., closer to their South African customers.

The same type of free-market explosion is occurring in

Brazil as a result of the government's removal of information technology trade restrictions 2½ years ago. The opening of the market has led to a change in the use of information systems in the Brazilian corporate environment, says Persio de Luca, partner and director at Arthur Andersen & Co. in Brazil. "That is the case with client/server platforms, which were embraced by users because they could now buy systems that suited their budget," de Luca explains.

During the last decade, the Australian economy has undergone a revolution of its own. Deregulation, mergers, buyouts and major corporate and governmental restructuring have swept the country and changed the role of corporate information technology and how it is used. Australia's IS managers say their biggest challenge is managing and reacting to substantial change.

"Business needs a rapid response from [information technology]," says Gary Campbell, director of information services at Australian retailer Coles Myer Ltd. "In a changing environment, the challenge is to ensure [that] application development can happen quicker," he says. "We have a
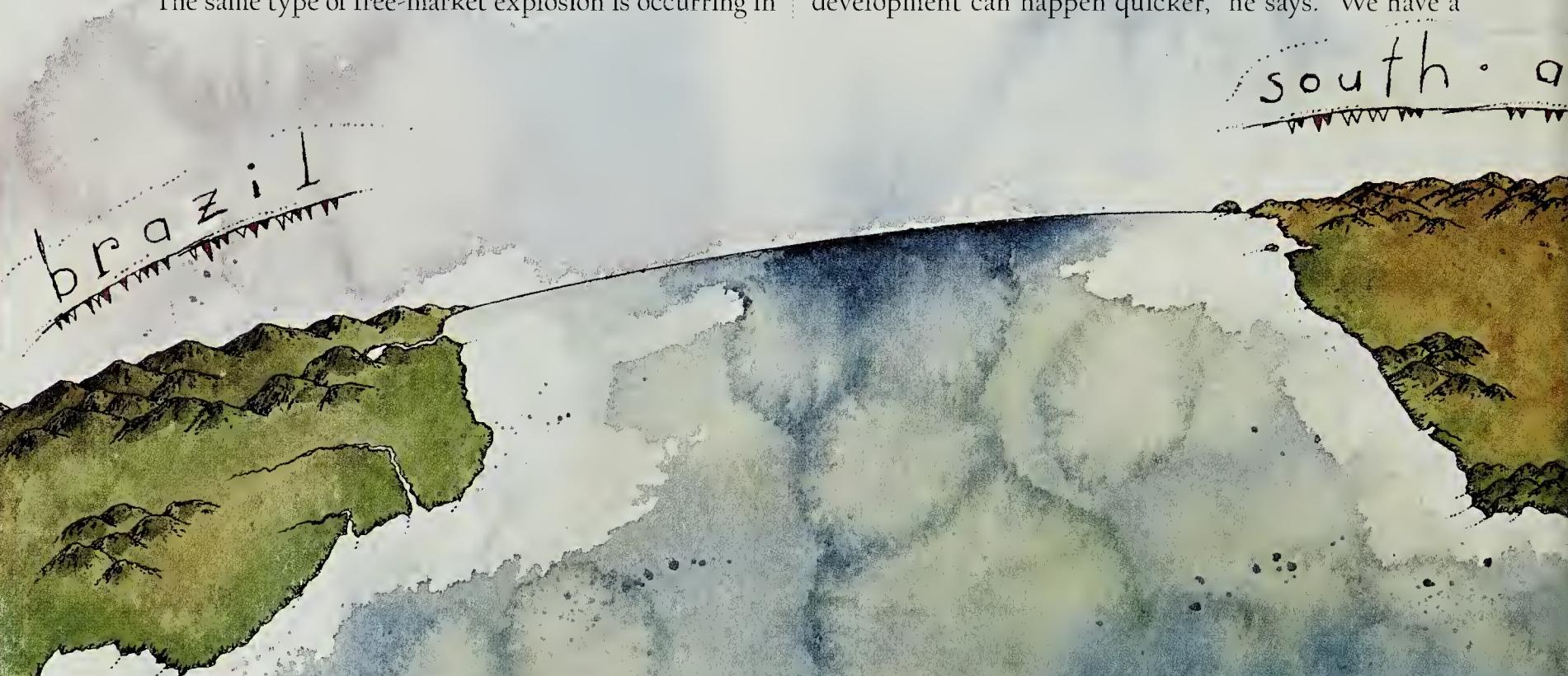
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strategy of reuse of design and components for applications and infrastructure. [We want to be] flexible and responsive to business needs."

Banking on technology. While all industries are buffeted by change, banks are particularly vulnerable due to their susceptibility to economic hiccups and heavy reliance on information technology.

In South Africa, the challenge for banks is not only to cater to the increasing number of black professionals who are rapidly advancing in the ranks of the private and public sectors but also to satisfy the needs of the millions of people who are "unbanked." An estimated three quarters of South Africa's adult population of about 25 million do not have any kind of bank account.

First National Bank Holdings Ltd., one of South Africa's four big banking groups, is counting on its installed corporate network to deliver products and services to this sizable unbanked sector. First National has been phasing out its aging ICL 2900 processors in favor of IBM System/370 mainframes. It also implemented a full suite of banking applications from Hogan Systems in Dallas, consolidated its computer centers from seven regional sites to two centralized locations, replaced its national backbone network and

Qantas' David Burden still relies on mainframes for fast transaction processing

installed more than 700 new automated teller machines (ATM).

The exercise was arduous and expensive. But Mike Jarvis, First National's general manager for information technology, says the network of ATMs paid off. The bank can now provide "around the clock" banking at almost any location in the country.

Jarvis says the focus of much of the bank's information technology capital expenditure budget —about $63 million this year — will go toward providing improved delivery mechanisms for First National's growing portfolio of products.

The bank intends to install more than 10,000 IBM PS/2s running OS/2 Extended Edition at its 550 branches throughout South Africa, Namibia and Botswana.

In a similar move, Banco Bradesco S.A., Brazil's largest financial conglomerate, has spent $200 million on information technology to automate its branch operations and improve transaction processing. "We couldn't find any system that would fit our high-volume retailer profile so we had to build one," says Aluízio Borges, Bradesco's systems director.

With almost 8 million financial transactions each day, Bradesco offers a response time of only one second in processing information. According to Borges, time saved was the most

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important result of the bank's technology investment.

Household appliance manufacturer Fisher and Paykel Ltd. in New Zealand has reinvented itself as a client/server enterprise with a single Unix operating system as the glue to unite all aspects of the organization. The Computer Associates International, Inc. Ingres relational database management system is at the heart of the company's flexible manufacturing process. The RDBMS can change product specifications within 20 seconds based on a software decision that's easy to execute.

The company's refrigeration plant, for example, manufactures up to 1,400 different models and is capable of making every model, every day.

Fisher and Paykel's distributed approach using CA's Ingres Star distributed database not only reduces cost and improves performance but also spreads the risk of product failure. According to group IS manager Bruce Caldwell, having a single set of standards as well as eliminating the duplication of software, processing and skills also helps improve flexibility.

The payback of the investment in open systems is already evident. Fisher and Paykel has halved its information technology budget, reducing operating expenditure on systems by 28% and doubling production. Manufacturing productivity is up by a factor of three. Export success in Australia, Europe, Japan and Asia has trebled over the past five years; 59% of all household appliances are now exported — up from 16% five years ago.

The trends toward client/server and open systems continue, but for many large information technology users in the Southern Hemisphere, mainframes and centralized databases are still of vital importance. Just ask David Burden, executive general manager of information technology at Qantas Airways Ltd., Australia's national airline.

First National Bank's Mike Jarvis: The network of ATMs in South Africa lets us provide 'around the clock' banking at almost any site in the country

Mike Persson / Saba
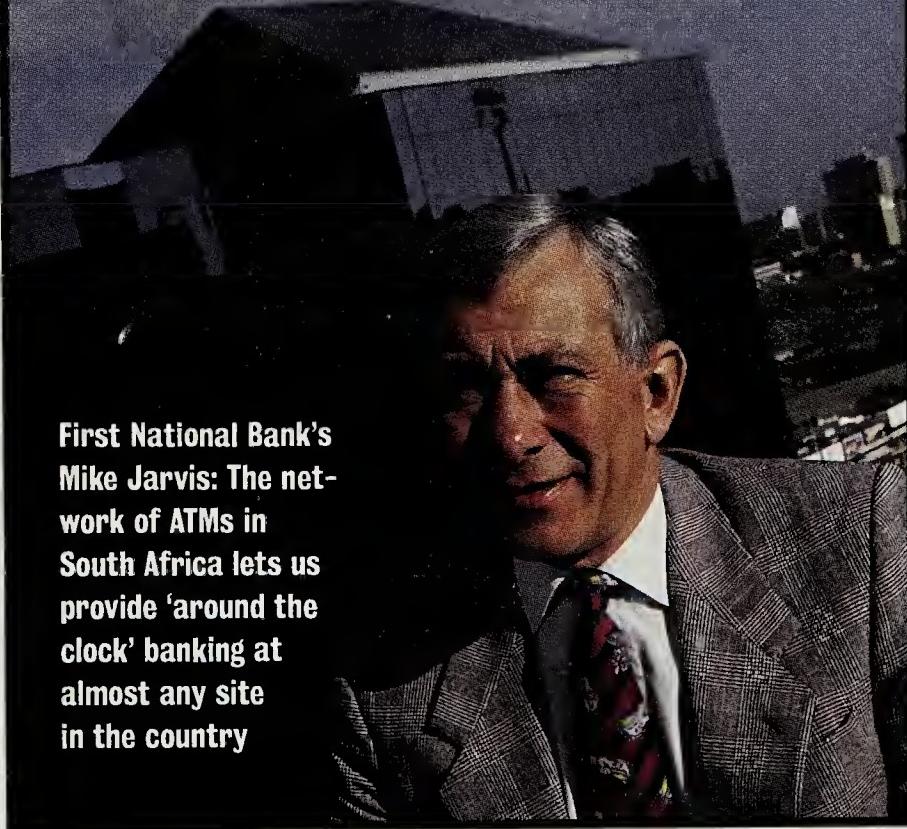
"We have incredibly high rates of transaction processing," he insists. "Currently, the only way to handle these is through our traditional, mainframe-based centralized systems," Burden says. "We have a number of client/server systems, and these will continue to grow, but our core systems still depend on central repositories."

Reliable infrastructure. Also working on the premise that centralized computing is key to business management is Brazil's national airline, Varig Brasilian Airlines SA, which moves 9.6 million passengers a year. The more reliable the infrastructure, the better Varig can serve its customers, explains Jose Carlos Sabate, who runs a computer center for Varig with two IBM 3090s, one Amdahl Corp. mainframe and one Fujitsu Ltd. 1400A mainframe control-

Bradesco's Aluízio Borges takes advantage of the Brazilian bank's 'flying bridge' between Osasco and São Paulo

Ricardo Azoury / Saba

ling 2,000 machines in Brazil and 1,700 worldwide.

Varig intends to invest $30 million this year to buy information and telecommunications systems, and it is especially interested in the increase in the processing ability of mainframes. The company reached the mark of 100 transactions per second last December, Sabate says.

Another big Brazilian spender committed to restructuring its information technology is Petroleo Brasileiro SA-Petrobras, the government company responsible for exploitation and production of all Brazilian petroleum. Last year, Petrobras invested $223.41 million in information systems and $105 million in telecommunications. One of Petrobras' main projects, started in 1993 and expected to be ready by 1996, is an ambitious plan to turn its 33 computer centers throughout the country into four centers concentrated in three Brazilian cities.

To concentrate corporate and scientific systems in large computer centers and to distribute data processing, some mainframes have been shut down while others are being reallocated. In many departments, substitution of high-end equipment is leading to downsizing processes involving RISC equipment and client/server models.

The challenge for the Brazilian oil company, however, is to fit these and other projects into its "Strategic Automation Plan," designed in 1992 and expected to continue until 2001.

"We want to completely integrate automation and information islands throughout the company," says Jose Carlos Betencourt, associated support superintendent for the Information Resources Service Department, which is responsible for information and telecommunications activities at Petrobras. 🌐
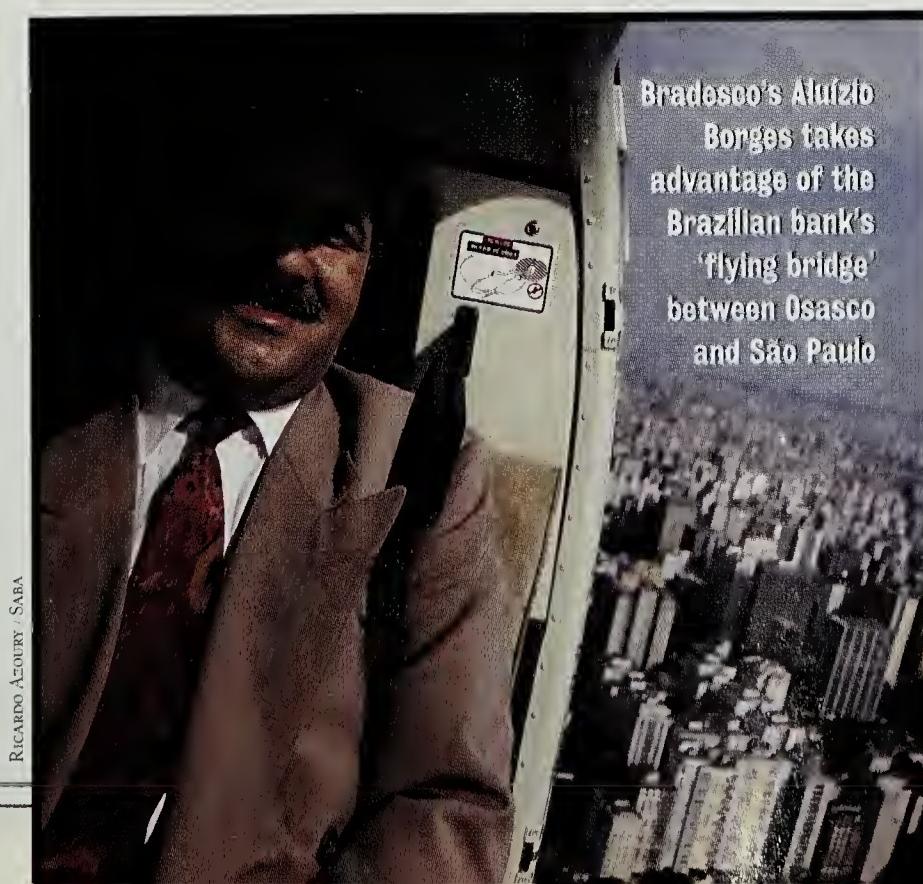
Getting wired

GETS WEIRD

By **Torsten Busse**

ANECDOTES THAT DESCRIBE THE volatile conditions of telecommunications in Eastern Europe are as abundant as the phone connections that drop in the middle of a conversation.

In the Bulgarian capital, Sofia, last year, thieves dug up and stole the main copper line connecting McDonald's to the local phone network not once but twice. In the Hungarian capital, Budapest, the editors of the Budapest Business Journal discovered they could not make phone calls when it rained. And in the Polish capital,

Setting up shop in Eastern Europe is no simple matter. With an infrastructure that is woefully behind the times, IS managers must be both creative and patient.

Warsaw, researchers at the Polish Agencja Badan Marketingowych y Spolecznych (Social and Market Research Agency) have little trouble making international phone calls, but calling home a few blocks away is a hit or miss operation.

Comparing Eastern Europe's telecommunications infrastructure to Western Europe's is like comparing a typewriter with a PC. As it stands today, one of the biggest concerns for global companies expanding into Eastern Europe is telecommunications. What Eastern Europe's state-owned

telecom agencies have in common are huge waiting lists for new phone lines and outdated networks in desperate need of modernization.

Despite telecom horror stories in the Wild East, observers say the situation is slowly but surely improving. During the past three years, the telecommunications companies and international telecommunications companies have poured an enormous amount of money into the development of the region's phone infrastructure with some positive results.

Additionally, Western businesses setting up shop in Eastern Europe are finding ways to get around the feeble phone networks of the region. Satellite services, mobile phone networks and international private carriers are some of the workarounds that allow commerce to continue despite existing communications obstacles.

Deutsche Bank AG in Frankfurt, for example, sidesteps local telecom networks by transmitting data via satellite dishes to its data processing centers in Western Europe, company officials say.

But satellite services are not feasible for everyone. A firm must generate a certain amount of traffic to make two-way

VSAT dishes economical, analysts say.

"Most [Eastern European] offices of Western companies tend to be small and don't generate that much traffic," says Graham Wilde, managing director at London-based telecom research firm CIT Research Ltd. Currently, there are only about 1,000 VSAT dishes in operation throughout Eastern Europe, he says.

Some local financial institutions, such as the Czech Republic's Investicni Banka, have established their own X.25 networks to transmit and process branch transactions throughout the country.

Chemical giant BASF AG in Ludwigshafen, Germany, has also connected its facilities in Eastern Europe to facilities in other countries via X.25 data lines. Some of these offices, however, have no connectivity to local manufacturing sites or to the company's data processing centers in Germany. Data lines are often interrupted, and even the basic electricity supply occasionally goes down, company officials say. BASF says, however, that local telephone and data companies are constantly improving the infrastructure.

Electrical engineering group ABB Asea Brown Boveri Ltd. in Zurich has a very aggressive strategy to enter Eastern Europe, where ABB employs about 25,000 people. "It's a business challenge and an IS challenge to build up these companies," says Bengt Skantze, chief of

The telecom infrastructure in Prague, ☞ as in most Eastern European capitals, is dreary for the large number of businesses awaiting dial tones

CARL ZEISS JENA

výkon — — —
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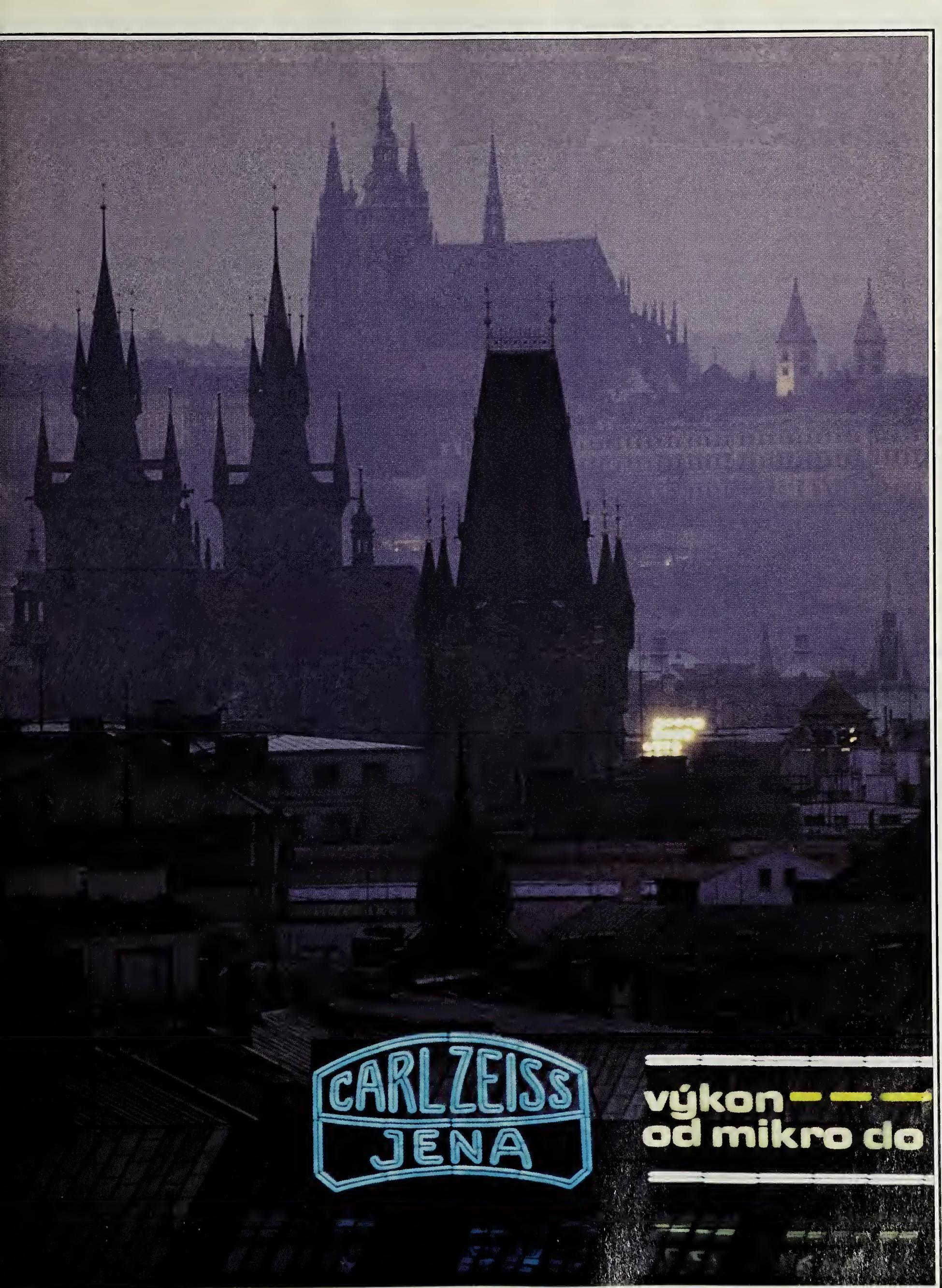
After the fall

F REEDOM WAS NOT THE ONLY THING Estonia inherited when it broke away from the former Soviet Union just four years ago. The small Baltic state, along with Latvia and Lithuania, inherited all the problems of a telecommunications infrastructure designed primarily to serve the phone-tapping activities of the KGB, the intelligence agency for the former Soviet Union.

"I can't say that we have had serious problems that can't be solved, but in many cases it takes time — too much time," says Tiina Merilo, information technology manager at the Estonian Foreign Affairs Ministry. "The main problem for me now is that physical [wire] connections in the Baltic states could be better," says Merilo, whose daily struggle is to connect Estonia's Foreign Ministry with its em-

bassies and consulates around the world.

All international calls from the Baltic countries had to be routed through Moscow, where the KGB's tapping devices were connected. Not only was the solution bad in terms of privacy, but the land-based cables had too little capacity, which produced poor quality communications.

When Lithuanian Prime Minister

didn't like the concept of talking on the phone while the KGB was listening.

What he got was a link that connected directly to the network of Norwegian state-owned carrier Telenors so international calls from Riga could be routed through Oslo.

Ironically, one of the main reasons the liberation process in the former Soviet Union was not squashed in its infancy was the KGB's lack of insight into modern telecommunications. The generals did not understand that the Internet reached far into the Russian academic world and that despite their efforts to block international phone lines, the global network enabled people to communicate with the outside world.

With their freedom, the Baltic states inherited a telecom infrastructure designed to serve the KGB.

Vytautas Landsbergis led his people to independence, one of the first things he did was to mount a satellite dish atop the parliament building in Riga. Landsbergis

Estonia's 17 embassies in Europe and the U.S. use the Internet to keep in touch with their home country.

Though there are still fundamental

ABB's Global Information Services committee. "But it has come out pretty well. We invested in standard systems, and we helped them with people from the West to install and train." Skantze acknowledges that building up telecommunications was a problem because of the poor quality of the telephone networks. ABB has also resorted to satellite communications in several countries.

Fast-food giant McDonald's Corp., meanwhile, is using BT's local access nodes in Eastern Europe to connect its branches in the East with its Central European headquarters in Vienna.

"Using BT's network is much more reliable. The quality is better, and it's cheaper" than what the Eastern European telecoms can offer, says Herbert Zoernpfenning, data processing manager at McDonald's Central Europe. The difficulty with using private carriers in Eastern Europe is that their network distribution tends to be limited, and local access nodes are not available everywhere, he says.

For Glaxo Holdings PLC in London, Eastern European markets remain too fragile to encourage an increase in its investments and operations there.

"It's a problem knowing what level of investment to make there," says John Handby, Glaxo's group information technology director.

Finding office space with phone lines already in-

stalled should be priority for any new business in Eastern Europe, says Adam Czarnecki, a researcher at the Agencja Badan Marketingowych y Spolecznych in Warsaw, which recently completed a study of Poland's telecommunications markets. "Otherwise, you might wait forever" for new phones, he says.

In Poland, there are more than 2 million outstanding applications for new phone lines, and depending on their location, subscribers may have to wait several years for a dial tone. The situation in the Czech and Slovak Republics, Russia, the Commonwealth of Independent States and even Hungary, which has made the most progress in the region, is similar: long waiting lists with millions of applications.

Cost the issue. The International Telecommunications Union (ITU) estimates that telecom network development programs in Eastern Europe will require investments totaling $94 billion over the next five years. And the ITU's figure may actually be too low if individual countries' current estimates are on target.

When US West, Inc., Deutsche Telekom AG and France Telecom agreed in October 1994 to jointly assist the Russian government in rebuilding the country's long-distance telephone network, the Russian government estimated that the project would require investments of up to $40 billion.

Because improving Eastern Europe's telecom in-

Eastern European markets remain too fragile to encourage an increase in operations there. "It's a problem knowing what level of investment to make there."

John Handby
Glaxo PLC
London

Norsk Hydro's Svein Breivik: 'Today, every second person you meet [in Russia] seems to have a portable [computer] and a mobile phone'

history and return to 'the good old days,'" says Svein Breivik, vice president for the Russian activities at oil company Norsk Hydro. "But I don't think it's possible. The changes have gone too far."

Just placing a telephone call to Breivik demonstrates how much things are changing. When you call Norsk Hydro's headquarters in Oslo, the operator says she'll connect you to Mr. Breivik. Moments later, the London/Oslo/Moscow line is established, and the conversation is carried across the oil company's internal network.

Norsk Hydro, which is trying to get a foothold in the lucrative oil fields south of the islands of Novaya Zemlya in the Arctic Ocean, has established an organization in Moscow comprising 35 people.

Breivik says he has seen radical changes since he arrived two years ago. "When I attended meetings in the beginning, it was not uncommon to see people using slide rules. Today, every second person you meet seems to have a portable [computer] and a mobile phone." 🌐

problems with the domestic infrastructure, circumstances have changed radically. Several carriers, including Sprint Corp., have established beachheads in the Baltics. International calls are now routed through Helsinki or Stockholm instead of Moscow.

Russia's telecommunications infrastructure is also undergoing radical change. Now, satellite and land-based links for international calls are in place in most areas; the next battleground will be the domestic network. But one of the main obstacles is the changing priorities of Russian politicians.

"Several politicians want to turn back

🖋 Written by Paul Leveraas, an IDG News Service correspondent in London.

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frastructure is an integral part of the region's overall economic reform, almost all countries have by now launched extensive telecom modernization programs. The programs generally aim to increase line capacity and density, modernize infrastructure and improve services.

Regulatory changes have also been made in various countries, including Hungary and the Czech Republic, in an effort to attract foreign investors.

To establish footholds in Eastern Europe,
Western businesses use
satellites and global telecom carriers to
get around nascent phone networks.

Measures include the partition of postal and telecom services; the separation of operating and regulatory functions; limitations on state control of telecoms; and the opening of local markets, mobile phone, satellite and value-added services.

In other places, however, pledges of full deregulation and privatization remain promises without deadlines, as is the case with the Polish state-owned telecom company Telekomunikacja Polska SA in Warsaw. Likewise, the Slovak government is

still debating the fate of its telecom company.

Seeing huge growth potential in spite of the challenges, Western European and U.S. telecommunications companies have been snapping up investment opportunities in the former Soviet bloc countries.

Last year, the MagyarCom consortium of Deutsche Telekom in Bonn and Chicago-based Ameritech Corp. spent $875 million for a 30% stake in Hungary's Matav telecom company.

The Czech Republic's SPT Telecom is now in the midst of selecting a strategic international partner that will be allowed to purchase a 27% stake in the state-owned company. Up to 10 European and U.S. telecom companies have expressed interest in bidding at prices rumored to range between $700 million and $1 billion. Deutsche Telekom and Ameritech are among the potential bidders, as are Bell Atlantic Corp., France Telecom, Royal PTT Netherland, Swiss Telecom and AT&T Corp. 🌐

In Poland, there are more than 2 million outstanding applications for new phone lines. Depending on their location, subscribers may have to wait several years for a dial tone.

🖋 Busse is an IDG News Service correspondent in Munich, Germany. Contributors include IDG News Service correspondents in Europe.

THE GIANT

STIRS

Gone are the banners and slogans. At last, China is entering the global economy.

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HE SHANGHAI No. 2 MACHINE TOOL WORKS FACTORY, LOCATED ON A NONDESCRIPT STREET IN the heart of the sprawling East China city for which it is named, stands as an austere testimony to the Chinese government's emphasis on strength through manufacturing. Gray, stark and forbidding, the exterior of the state-owned factory complex would make a fitting backdrop for a documentary on Chairman Mao's Great Leap Forward.

By **Don Tennant**

Yet venturing inside the complex, you clearly see that some remarkable changes are occurring in the People's Republic of China (PRC). It's not just the modern imported manufacturing equipment installed on the huge shop floor that bespeaks the changes. It is perhaps what you don't see that is most telling.

Gone are the ubiquitous red banners that for decades exhorted workers to toil for the glory of the Chinese Communist Party. Lou Xin, the plant's information systems manager, laughs at mention of the banners. "That was in the past. Now we're concerned about business," he says.

A focus on business issues and openness to Western management has made China an attractive market for foreign investment. As the PRC's state-owned corporations evolve from centrally planned models of inefficiency to market-driven commercial enterprises, they are finding themselves competing against an influx of foreign firms eager to gain a share in China's huge consumer market.

While Chinese law now allows foreign firms to set up wholly owned subsidiaries on the mainland, these firms more commonly open representative or liaison offices that report to subsidiaries based elsewhere in Asia, often in Hong Kong or Singapore.

When a foreign firm does opt to set up manufacturing or other large-scale operations in the PRC, it typically teams with a Chinese partner to facilitate the mandatory relationship-building. This also helps it navigate around the obstacles inherent in the Chinese government bureaucracy.

Any foreign company that sets up

Consumers in the PRC are enjoying their new found affluence. It's not all smiles, however, for Western companies setting up shop in China.

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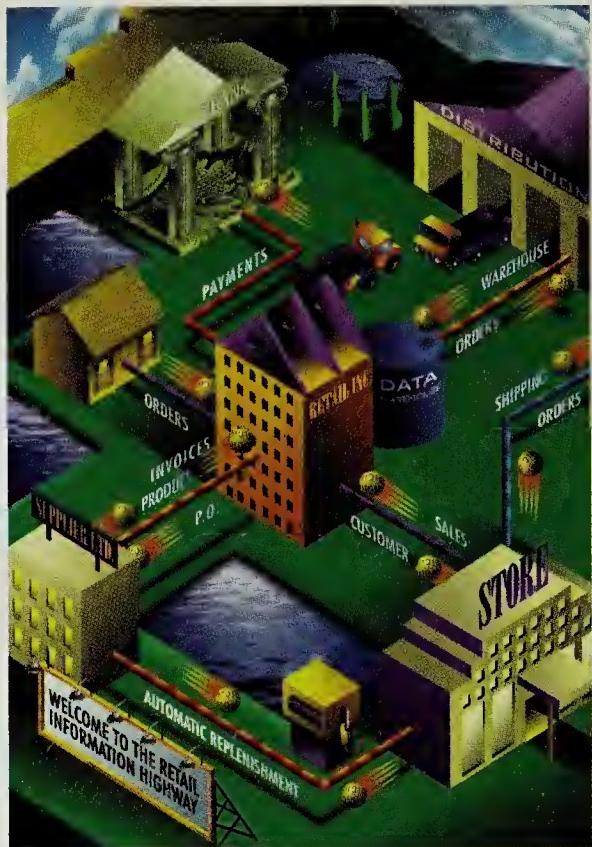
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TANDEM

TANDEM MEANS BUSINESS

operations in China will need to rely heavily on its IS department to tackle a host of challenges, a primary one being China's underdeveloped communications infrastructure.

Shanghai Johnson Ltd. is an 8-year-old joint venture between S. C. Johnson & Son, Inc. — a Racine, Wis.-based consumer goods manufacturer best known for household products such as Raid insect killer and Pledge furniture polish — Shanghai Daily Chemical Industrial

Shanghai No. 2 Machine Tool Works' Lou Xin has spent scarce resources training IS specialists, only to see them defect to joint ventures

Development Corp. While Shanghai Johnson is an old-timer by Sino-American joint-venture standards, communications hurdles still confront IS manager Kirk Wang.

When Shanghai Johnson moved to a new location in Shanghai last November, the dedicated communications link to the company's Wisconsin headquarters was down for two months while the company waited for a leased line. This made for some unhappy users.

"Foreign employees have a lot of experience with E-mail systems, and in China they are looking for the same service," Wang says, explaining one facet of the company's requirement for a 64K bit/sec. leased line to the U.S. Getting the over-

seas line was no problem; the Shanghai Posts and Telecommunications authority provides AT&T Corp.'s Skynet Intersat Business Service for commercial users. The difficulty lay in getting the connection to the local telephone office so Shanghai Johnson could access the Skynet uplink.

"At our previous location, we used microwave to link to the nearest telephone office," Wang says. "But because of the tall buildings around here, we can't use microwave, so we had to order [a Digital Data Network] leased line," a process that routinely takes two months.

Lawrence Kwan, IS manager at Kodak (Far East) Ltd. in Hong Kong, is exploring setting up a wide-area network to link Kodak's liaison offices in Beijing, Shanghai and Guangzhou with its China headquarters in Hong Kong and the Asia/Pacific regional office in Tokyo. While his effort is still at the planning stage, he's wary about his prospects for a straightforward implementation without having made the proper connections.

"What I've heard is, it's a bit difficult to get a private leased line in China. It really depends on the relationship your company has with the telecommunications authorities," Kwan says.

Even more difficult, in many cases, is getting a simple dial-up voice line installed. While the Chinese government has signed hundreds of millions of dollars' worth of telephone-related contracts in the past two years with the likes of AT&T, Northern Telecom Ltd., France's

Alcatel Alsthom SA and Sweden's Telefon AB LM Ericsson, observers warn that it will be years before China is on par with Western countries. Even in large cities such as Shanghai and Beijing, getting a single telephone line installed is a three-month affair.

"Though communications have vastly improved in the last decade, it is still a problem," says Ronald Yu, chairman of the Information Technology Committee of the American Chamber of Commerce in Hong Kong. "The communications links are something that IS managers need to consider quite carefully because they may not be as fast or as stable as people expect."

Lacking support. Telecommunications inadequacy aside, IS managers who enter China will find there is little lacking in

A focus on business issues and *openness* to Western management has made China an attractive market for foreign investment

the way of available technology. Most of the key Western hardware, software and networking vendors have a presence in the PRC, and the recent liberalization of Western export control policies has virtually eliminated the product availability barrier. What's often lacking, Wang says, is adequate support.

Wang has set up an Ethernet network configured with 3Com Corp. hubs, a Cisco Systems, Inc. 2500 router and a Newbridge Networks Corp. 3600 Mainstreet multiplexer. Shanghai Johnson is running Novell, Inc.'s NetWare 3.12 with PC applications, including Microsoft Corp.'s Microsoft Mail. Wang also has an IBM AS/400 tied in to the network.

However, he still doesn't get the support he needs. "The vendors often know less than our own people, so we have to rely on support from headquarters," Wang says.

For another AS/400 site, China Schindler Elevator Co. — a three-way manufacturing joint venture set up in

Beijing by Switzerland's Schindler Holding, the PRC's China Construction Machinery Corp. and Hong Kong-based Jardine Schindler (Far East) Ltd. — the support issue is not so much availability but cost, which in China-Schindler's case is prohibitive.

China-Schindler has successfully implemented BPCS, a manufacturing resource planning (MRP) II package from Chicago-based System Software Associates, Inc. Li Wen Hua, China-Schindler's computer center chief, extols the improvements in accounting accuracy and manufacturing efficiency that his firm has enjoyed since the plant's implementation of BPCS began in 1992.

For China-bound IS operations, personnel is bound to be the biggest headache.

However, Li adds that his company and many others in China are not in a position to maintain that level of efficiency at any cost. "SSA's support fees are too high," he says. "If it insists on these high fees, SSA will lose some part of the market."

China-Schindler's director for enterprise management, Ge Man Zeng, says, "MRP II itself has its imperfections, so an outlay of $800 per day for a support consultant is not cost-effective."

Support issues have played a key role in prompting foreign firms to base their IS operations off the mainland, where support is typically less accessible and manageable.

Monsanto Far East Ltd., for example, a subsidiary of the U.S. chemical giant, has sited its China hub in Hong Kong. "There is a lot of technical expertise in Hong Kong, and we have more sourcing and support options than we would have in China," says Matthew Kwok, Monsanto Far East's IS manager.

Still, the biggest headache for a China-bound IS operation is likely to be personnel: finding, affording and keeping staffers.

"The issue of remuneration inflation is a fairly serious one in China," says the American Chamber of Commerce's Yu. "Because a lot of companies are coming to China, they are willing to bid for employees. The biggest problem Western companies will have is that their wage scales will not be able to handle this kind of [wage] inflation."

Shanghai Johnson's Wang agrees. "Now in the China market, finance and IS people are rare and are in high demand. Qualified people can find good positions easily," he says.

As a result, there is high turnover among experienced staffers, especially from state enterprises, whose budgets do not approach those of foreign firms and joint-venture companies.

Shanghai No. 2 Machine Tool Works' Xin, for example, has spent scarce resources training more than one IS specialist, only to see them defect to joint ventures. The problem may well prompt the Chinese government to crack down on job-hopping state employees. 🌐

An Elixir for India

The 1990s have seen a major transformation in the maturity level of Indian end-user organizations. Not content with the rudimentary applications they had in the 1980s, users today demand information technology that contributes to the bottom line. This translates into a groundswell of support for open systems.

"It is now our policy to support only open systems," declares K. L. Vindal, general manager of management systems at Hindustan Petroleum Corp. Ltd., a petroleum refiner and marketer based in Bombay.

Others concur. "We have decided to support open systems for a number of reasons. It gives you cost advantages and hardware independence. There is higher reliability and ease of implementation," says Sandeep Dhar, manager of Citibank Corp.'s Global Consumer Division in India.

Due in part to the opening of the Indian economy to foreign competitors, total quality management, ISO 9000 standard and corporate restructuring are also taking hold. Information systems, the re-engineering enabler, is seen as the elixir.

"MIS departments, which were traditionally used as information systems for managers, have slowly begun to evolve as driving forces of business process re-engineering," says Rita Basu, a consultant at A. F. Ferguson & Co., a leading Indian information technology consultancy.

This is understood at Tata Engineering and Locomotive Co. Ltd. (Telco), a Bombay-based maker of commercial vehicles, passenger cars and spares with plants in Poona, Jamshedpur and Lucknow. "Information technology has to graduate from passive information support to actively driving the user's business process re-engineering and help them manage their tasks effectively," says S. D. Pradhan, general manager for management services at Telco.

Information technology must reduce product development cycle time, reduce manufacturing cycle times, cut costs and improve profitability for any company to remain internationally competitive, Pradhan says.
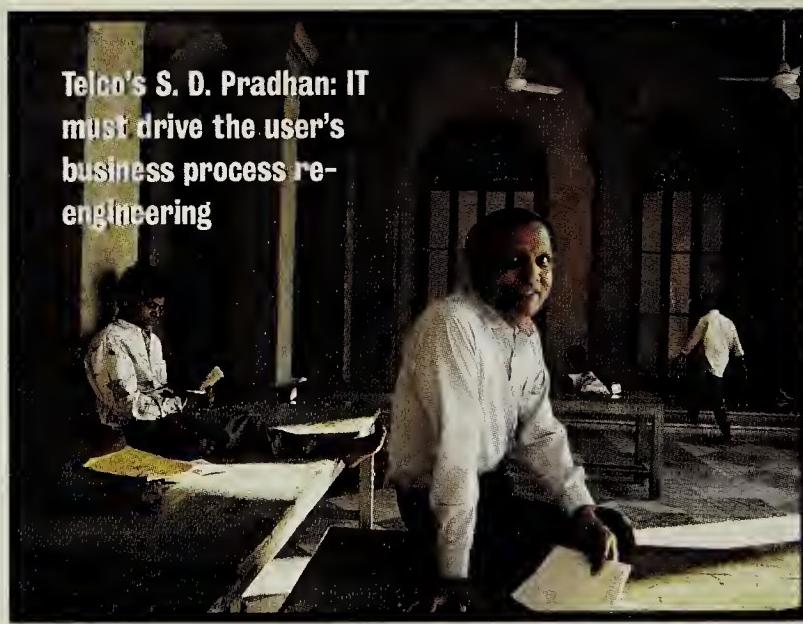
Telco's S. D. Pradhan: IT must drive the user's business process re-engineering

To this end, Telco has spent more than $25 million on IT in the past two years to computerize everything from design to delivery, Pradhan adds. The company uses a network of IBM RS/6000 R24 parallel servers and Silicon Graphics, Inc. Power Challenge Unix-based workstations; PCs are connected on a Fiber Distributed Data Interface and Ethernet LAN. Telco designs its vehicles using computer-aided design and manufacturing and design automation tools.

Concurrent engineering is being tackled in two phases. In phase one, Telco is coordinating design, planning and vendor development. In phase two, Telco envisions using an object-oriented product manager to automate product development coordination. — *Written by Vinita Chawla in New Delhi* 🌐

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TANDEM MEANS BUSINESS

The Global

N THE PREMIER ISSUE OF *The Global 100*, *Computerworld*'s objective was to present a list — not a ranking — of 100 outstanding users of information technology from around the world. Besides naming outstanding companies, *Computerworld* wanted the list to reflect leading information technology users in diverse industries and countries from all regions of the globe. The result is an eclectic combination of organizations from 31 countries: Some are globally integrated corporations, some are international or national leaders, and some are government agencies. All have passed muster based on a combination of qualitative and quantitative analysis.

Company	Industry/Description	Country	Revenue ($ in millions)
ABB Asea Brown Boveri Ltd.	Industrial Equipment. Specializes in power generation and transmission systems, power distribution and control, automation products, systems and services	Switzerland	$28,000
AGFA Gevaert NV [1]	Appliances and Electronics/Electrical/Photographic Equipment. Manufactures photography equipment and printing supplies	Belgium	$7,000
AMR Corp.	Transportation. Provides airline passenger and cargo carrier services	USA	$15,800
Aerospatiale [1]	Transportation. Produces the Airbus planes and participates in the Ariane projects in space division	France	$9,500
Amadeus [1]	Transportation. Global travel company with computerized distribution and reservation system	France	$130
Arab National Bank	Banking. 130 branches provide corporate, private and investment banking	Saudi Arabia	$507
Arcelik AS	Appliances and Electronics/Electrical/Photographic Equipment. Manufactures large household appliances	Turkey	$1,270
Australia and New Zealand Banking Group	Banking. Provides full banking and financial services for Australia, New Zealand and 50 countries worldwide	Australia	$5,179
BMW	Automotive. Manufactures and distributes luxury automobiles and motorcycles worldwide	Germany	$16,710
Banco Ambrosiano Veneto S.p.A.	Banking. Provides banking facilities, leasing, property management, insurance brokerage, merchant banking and other financial services	Italy	NA
Banco Bradesco SA	Banking. The largest private bank in Brazil	Brazil	$12,160
Banco Exterior de España	Banking. Specializes in commercial, corporate and international banking, investment and financial services	Spain	$3,787

All dollar figures are for most recent fiscal year available.   [1] 1994 fiscal year   [2] Government budget   [3] 1995 fiscal year   * Computerworld estimate

THERE IS NO DEFINITIVE quantitative measure that captures what it means to be an "outstanding" user of information technology. Information technology and information systems productivity comes close. However, to collect consistent data using highly refined definitions is virtually impossible when canvasing the globe. No two countries report financial data in the same way.

Computerworld, instead, took the qualitative route. For one thing, a qualitative evaluation is doable. For another, it can capture the essence of "outstanding."

Late last year, *Computerworld* asked information technology experts from around the world to nominate companies, nonprofit organizations and government agencies that they believe demonstrate excellence in the use of information technology.

The nominators included computer vendors, management and information technology consultants and International Data Group (IDG) publications from around the world (see the Global 100 Nominating Committee, page 2).

Companies had to hold a "leadership position" in at least one of three categories: a functional category, such as manufacturing or logistics; a key technology, such as networking or client/server; or management, such as business process re-engineering or management of dispersed groups or divisions. Companies whose primary business is

computer hardware or software or telecommunications equipment were excluded.

From the 500-plus nominations they received from 40 countries in January, *Computerworld* researchers gathered financial and IS data about each company from public sources, from the nominated companies and from IDG publications around the world.

The final Global 100 listing was selected by *Computerworld*'s Special Projects Team based on research and analysis of available data on organization size, industry position, geographic location, country leadership in IS and the use of information technology.

PROCESS OF Illumination

Profit ($ in millions)	IS employees	IS spending ($ in millions)
$2,200	5,000	$700
$5	200	$30
-$110	More than 5,000	$250–$499
-$25	500-999	$250–$499
$4	500-999	$50–$99
$108	138	$26
$112	245	$90
$185	100–249	$100–$249*
$297	1,000	$323
$103	470	$90
$374	2,500	$150
$228	NA	NA

Faces

The people behind the organizations

THIS 58-YEAR-OLD corporate vice president of group information systems embraces the belief that technology is needed to create a powerful company. He claims that there is no place here for timidity when it comes to new applications and systems. "ABB is a company that makes aggressive use of modern technology," Fredrik W. Bystrand says. Technology awareness is crucial for a company to perform at its best, he says.

Fredrik W. Bystrand
ABB, Switzerland

IMPLEMENTING THE LATEST technology keeps the Arab National Bank's IS manager more than busy. "We are working toward being at the forefront of technology using information engineering to automate processes that will provide quality and timely delivery systems," 46-year-old Mohammed I. Al Mansour says. But the customer is never forgotten in this pursuit of technology. "Our ultimate objective is to be a quality and responsive organization that will contribute to the financial stability of the community and the economy."

Mohammed I. Al Mansour
Arab National Bank, Saudi Arabia

The Global 100

Company	Industry/Description	Country	Revenue ($ in millions)
BankExim [1]	Banking. Limited liability commercial bank focuses on retail banking, corporate lending, investment banking and international operations	Indonesia	$550
Barclays Bank PLC [1]	Banking. One of the largest financial services organizations in the UK, operating in 76 countries	UK	$11,000
Bass PLC	Food & Beverage. Brews and markets Bass beverages to worldwide consumers	UK	$7,034
British Petroleum Co. PLC	Oil & Gas. Has main oil production operations in Alaska and North Sea with exploration worldwide; markets through international service stations	UK	$52,425
The Broken Hill Proprietary Co. Ltd.	Metals. Australia's largest steel producer and natural resources company	Australia	$12,218
CNP Assurances SA [1]	Insurance. Government-owned personal insurer in France specializes in life insurance, casualty and capitalization	France	$14,600
CODELCO Chile-Division Chuquicamata [1]	Metals. World's largest copper producer produces mainly electrolytic copper and molybdenum	Chile	$1,592
CSX Corp. [1]	Transportation. Railroad transportation manages freight car fleet and maintenance repair shops as well as international transportation companies	USA	$9,500
Cemex SA	Mining and Other Process Manufacturing. Fourth-largest cement producer in the world and the largest in Latin America	Mexico	$2,976
The Charles Schwab Corp. [1]	Financial Services. Holding company with subsidiaries that provide discount brokerage services	USA	$1,060
The Chase Manhattan Corp. [1]	Banking. Financial holding company with subsidiaries in advisory services, credit-card services and commercial, mortgage and investment banking	USA	$11,187
Chicago Mercantile Exchange [1]	Financial Services. Provides trading services for futures commodity exchange	USA	$145
The Coca-Cola Co.	Food & Beverage. Manufactures, markets and distributes soft drink and juice products	USA	$13,957
Coles Myer Ltd. [1]	Retail. Largest retailer in Australia operates supermarkets and department, discount and speciality stores	Australia	$11,300
The Dai-Ichi Kangyo Bank Ltd. [1]	Banking. Biggest financial institution in the world in assets and deposits	Japan	$27,778
Deutsche Bank AG	Banking. Germany's largest financial institution focuses on retail, private and corporate banking, financial services, trading and foreign exchange	Germany	NA
Deutsche Bundespost Telekom	Communications. Provides development and maintenance of the German telecommunications networks, local conferencing, directory assistance, voice mail, etc.	Germany	$33,971
Deutsche Lufthansa AG	Transportation. Germany's national airline with worldwide network providing flights to all continents	Germany	$10,193
ENEL S.p.A.	Utilities. Produces and distributes power generating and transmitting systems worldwide	Italy	$21,304
Eli Lilly and Co.	Pharmaceuticals. Pharmaceuticals company focuses on antibiotics, insulin, Prozac and medical devices	USA	$6,452
Emirates Airlines	Transportation. International carrier of the United Arab Emirates serves 34 destinations in 27 countries	United Arab Emirates	$645
Fiat S.p.A.	Automotive. Manufactures and sells automobiles, commercial vehicles and agricultural and construction equipment	Italy	$31,850

All dollar figures are for most recent fiscal year available.   [1] 1994 fiscal year   [2] Government budget   [3] 1995 fiscal year   [*] Computerworld estimate

Profit ($ in millions)	IS employees	IS spending ($ in millions)
$75	130	$10
$3,900	2,500–4,999	More than $1,000
$551	500–999	$100–$249
$1,345	1,000–2,499	$500–$1,000
$948	1,000–2,499	$100–$249
$236	227	$113
$456	Less than 100	$5–$9
$993	1,200	$160
$537	100–249	$25–$49
$135	500–999	$100–$249
$1,205	3,500	$600
$20	175	$34
$2,176	100–249	$100–$249
$353	1,000	$188
$117	500–999	NA
$3	2,000	$975
-$1,655	2,500–4,999	$500–$1,000
$6,680	1,000–2,499	NA
NA	1,300	$297
$480	2,500–4,999	$250–$499
$55	270	$28
-$1	1,000–2,499	$60

Faces

AS DIVISION HEAD OF the System and Technology Division at BankExim, Ietje Soetjipto, 53, is responsible for the operation of five departments. To make the best use of each department's strengths, she encourages flexibility and joint projects. A rigid structure would isolate the departments and undermine the goal of the organization, she says. Because her mission is to be at the forefront of banking technology, Soetjipto knows that her division must always be looking to how it can apply technology.

Ietje Soetjipto
BankExim, Indonesia

MORE THAN 1,000 employees report to this vice president for management of IS functions. His recent re-engineering project increased Codelco's productivity while reducing its costs. Attempts to create a more effective organization have succeeded, and now mine management and truck routing are available on-line. And Oscar A. Letelier, 46, does not plan to stop there — he's always looking for ways to strengthen the company through IS.

Oscar A. Letelier
CODELCO, Chile

DON'T HAVE THE BOSS'S EAR?

You're not alone. Only one-third of CIOs report directly to the CEO, according to a survey of 100 companies nominated to the Global 100.

SHORTCUTS ARE NOT Hugh R. Pride's style. The 50-year-old general manager of information technology at Emirates Airlines acknowledges that "moving to client/server has not been without pain." But his No. 1 priority is the airline's efficiency, so he refuses to sacrifice performance. Pride says he believes the move to client/server helps secure Emirates a place in the competitive airline industry. "We intend to use information technology to maintain our leadership position," he says.

Hugh R. Pride
Emirates Airlines, UAE

ELISABETH LYON

MORE

Company	Industry/Description	Country	Revenue ($ in millions)
Fidelity Investments [1]	Financial Services. Provides services including mutual funds, brokerage, insurance and retirement plans	USA	$2,800
First National Bank Holdings Ltd. [1]	Banking. Holding company with subsidiaries specializing in commercial banking	South Africa	NA
Fisher and Paykel Ltd.	Appliances and Electronics/Electrical/Photographic Equipment. Manufactures refrigerators, freezers, washing machines, dishwashers, electric ranges, etc.	New Zealand	$420
Ford Motor Co.	Automotive. Manufactures, sells and leases cars, trucks and related parts in vehicles	USA	$108,521
Glaxo Holdings PLC [1]	Pharmaceuticals. Researches, develops, manufactures and markets prescription medications	UK	$8,852
Groupe Paribas [1]	Banking. Finance and investment company provides commercial, investment and financial services as well as investment portfolio operations	France	$5,760
Hindustan Lever Ltd.	Consumer Products & Apparel. Produces detergents, personal products, chemicals, fertilizers and agri-products	India	$800
Hyundai Corp. [1]	Automotive. Largest car manufacturer in South Korea	South Korea	$11,300
ITT Hartford	Insurance. Holding company with subsidiaries that underwrite and sell property, casualty, personal automobile, home owners, life and health insurance plans	USA	$10,066
Information and Decision Support Center [2]	Government. Created and now manages the Egyptian government's information technology and decision-support infrastructure, providing an industrial base for the country	Egypt	$14
Japan Finance Corporation for Small Business [1,2]	Government. Independent agency supports economic development by providing long-term financing and information to Japan's small and midsize businesses	Japan	$27
Jusco Co. Ltd.	Retail. Sells products including clothing, food, household goods, electric appliances, furniture, cosmetics, tobacco, firearms and pharmaceuticals	Japan	$14,419
Kao Corp. [1]	Consumer Products & Apparel. Manufactures consumer products, fatty chemicals and information technology products including floppy disks	Japan	$7,503
Kvaerner Engineering AS	Industrial Equipment. Builds ships, operates shipyards and provides engineering and consulting services for the oil and gas industry	Norway	$3,263
The Kwangju Bank Ltd.	Banking. Provides commercial banking and loans for small and midsize ventures, leasing and exchange of currencies	South Korea	NA
MCI Communications Corp. [1]	Communications. Provides long-distance telephone, fax and electronic-mail services	USA	$13,300
Merrill Lynch & Co., Inc.	Financial Services. Holding company with subsidiaries providing brokerage, investment, banking and credit services, asset management, Insurance, debt and equity offerings	USA	$16,588
Metropolitan Toronto Police [1,2]	Government. One of the largest municipal agencies in North America; serves all cities adjoining Toronto	Canada	$517
Michigan Department of Social Services [2,3]	Government. Manages eligibility determinations and benefit authorizations for publicly funded programs; provides preventive, protective and self-sufficiency services	USA	$7,500
Misumi Corp. [1]	Industrial Equipment. Catalog-based supplier of commodity industrial components	Japan	$190
NSK Ltd.	Industrial Equipment. Global manufacturer of bearings, automotive components and precision machine parts	Japan	$3,157
National Computer Board [2]	Government. Statutory board under Singapore's Ministry of Finance that develops information technology in Singapore	Singapore	$50

All dollar figures are for most recent fiscal year available.   [1] 1994 fiscal year   [2] Government budget   [3] 1995 fiscal year   * Computerworld estimate

Profit ($ in millions)	IS employees	IS spending ($ in millions)
NA	1,000-2,499	$250-$499
$216	1,000-2,499	$63
NA	70	NA
$2,529	2,500-4,999	$250-$499
$2,039	NA	NA
$580	1,000-2,499	$250-$499
$74	Less than 100	$5-$9
$181	100-249	$50-$99
$493	1,000-2,499	$100-$249
$0	312	$11
$0	Less than 100	$1-$4
$74	NA	NA
$215	NA	$135
$130	250-499	$50-$99
NA	81	$9
$795	2,500-4,999	$500-$1,000
$1,359	2,500-4,999	$500-$1,000
$0	165	$17
$0	250-499	$50-$99
NA	11	NA
$35	100-249	$25-$49
$0	1,000-2,499	$25-$49

Faces

A MAJOR RESTRUCTURING was needed at Fisher and Paykel, due to harsh economic conditions in the late 1980s, so Bruce Caldwell, group manager of IS, and his department chose a central source of information and created a shared database structure. Caldwell calls this structure a "common scoreboard." Information technology is not limited to in-house operations; the advanced technology benefits customers as well. Appliances contain computer systems that provide graphical presentational tools and information.

Bruce Caldwell
Fisher and Paykel Ltd., New Zealand

Brazil represents the largest market for information technology in Latin America, according to IDC. The country accounted for

41%

of the entire IT spending in the region in 1993.

"I'D HATE TO BE A CEO today who didn't understand the power of information technology," says 27-year IS veteran Roger Mahabir. So would his boss. In the past two years, the director of computing and telecommunications has helped save the fourth-largest police force in North America $21.3 million. But Mahabir's interests go beyond money. At 41, he is the founding director and chief executive officer of Alternative Computer Training for the Disabled. "Partnerships make people successful. No one individual can be successful," he says.

Roger Mahabir
Metro Toronto Police, Canada

Who says

the Japanese are technology laggards? Nippon Telegraph and Telephone is one of three Global 100 companies in the IT billion-dollar club.

JANELL GENOVESE

MORE

The Global 100

Company	Industry/Description	Country	Revenue ($ in millions)
National Informatics Centre [2,3]	Government. Largest VSAT network in India; uses satellite communications for exchange of information	India	$25
New Zealand Inland Revenue Department [1,2]	Government. Collects revenue for government funding	New Zealand	$375
Nike, Inc. [1]	Consumer Products & Apparel. Designs and manufactures athletic footwear, sports wear, bags and accessories	USA	$3,790
Nippon Telegraph and Telephone Corp.	Communications. Provides services including video and satellite communications, digital data exchange, pocket pager, videotex, fax, networking and videoconferencing	Japan	$64,586
The Nomura Securities Co. Ltd. [1]	Financial Services. Japan's largest securities house, with 150 domestic offices and 10 overseas offices	Japan	$6,585
PECO Energy Co. [1]	Utilities. Provides electric and natural gas services	USA	$4,000
Petroleo Brasileiro SA-PETROBRAS	Oil & Gas. State-controlled company explores, refines, produces and sells petroleum in Brazil and overseas	Brazil	$18,029
Phillips Petroleum Co. [1]	Oil & Gas. Explores and produces crude oil, natural gas liquids and natural gas	USA	$12,400
Pohang Iron and Steel Co. Ltd.	Metals. Manufactures and sells hot-rolled and cold-rolled steel products, plates, wire rods, silicon steel sheets and stainless steel products	South Korea	$8,650
Privatbank, Commercial Bank [1]	Banking. Full banking services specializes in clearing operations, retail banking and trade finance	Ukraine	$194
Qantas Airways Ltd. [1]	Transportation. Australia's major international airline	Australia	$4,853
Rolls Royce PLC	Transportation. Market leader in aero, marine and industrial gas turbines, power generation, nuclear engineering and materials handling	UK	$5,205
Royal Dutch PTT Telecom B.V. [1]	Communications. Provides worldwide postal and telecommunications services to businesses and private customers	Netherlands	$6,000
The Royal Hong Kong Jockey Club [1]	Recreational Services. Horse racing, betting and membership services; operates the lottery as a nonprofit organization, giving surplus to charities	Hong Kong	$8,700
Ryder Systems, Inc.	Transportation. Full-service leasing includes short-term rental of trucks, tractors and trailers and related services	USA	$4,217
Saab-Scania AB	Automotive. Develops, manufactures and markets trucks, buses, civil and military aircraft, cars, missiles and satellites	Sweden	$13,319
Samsung Electronics Co. Ltd.	Appliances and Electronics/Electrical/Photographic Equipment. Produces TVs, VCRs, washing machines and microwave ovens	South Korea	$10,000
Scandinavian Airlines System [1]	Transportation. Airline consortium represents Denmark, Norway and Sweden; operates its own hotel chains and offers vacation tour packages	Sweden	$4,560
Seiyu Ltd.	Retail. Retail stores and convenience store operations with subsidiaries throughout the world	Japan	$10,195
Sevel Argentina SA	Automotive. Produces, sells and exports cars, trucks and spare parts	Argentina	$1,890
Seven Eleven Japan Co. Ltd. [1]	Retail. Japan's leading convenience retailer specializes in consumer goods	Japan	$1,881
Singapore Network Services	Communications. Created the world's first nationwide electronic data interchange network called TradeNet, linking more than 20 government agencies throughout Singapore	Singapore	$16

All dollar figures are for most recent fiscal year available.   [1] 1994 fiscal year   [2] Government budget   [3] 1995 fiscal year   *Computerworld estimate

Profit ($ in millions)	IS employees	IS spending ($ in millions)
$0	2,500-4,999	$25–$49
$0	343	$61
$299	250-499	$10–$24
$484	More than 5,000	More than $1,000*
$480	Less than 100	NA
$1,000	215	$110
$673	1,000-2,499	$100–$249
$484	500-999	$100–$249
$950	1,000-2,499	$50–$99
$10	49	$1
$115	500-999	$100–$249
$114	500-999	$100–$249
$1,000	2,500-4,999	$250–$499
$237	250-499	$50–$99
-$61	500-999	$100–$249
$199	250-499	NA
$467	More than 5,000	More than $1,000
$202	1,000	$53
$50	Less than 100	$50–$99
$84	NA	$100–$249
$448	Less than 100	$50–$99
$2	100-249	$5–$9

Faces

AS ONE THE LARGEST employers in Japan, Nippon Telegraph and Telephone Corp. needs a strong information systems department to keep it on track. At age 56, senior executive of IS Kyouichi Shimazaki knows how to run a structured organization. He stresses the importance of planning, and he labels high achievements in this area as part of Nippon Telegraph and Telephone's company mission. Employees are wise to share their innovative ideas because Shimazaki says he believes in "keen sensitivity, high ideals and daring actions."

Kyouichi Shimazaki
Nippon Telegraph and Telephone Corp., Japan

FORD may be the largest automaker on the list, but **VOLVO and FORD** tied in total IT spending at $375 million. Per employee, **VOLVO** spent more than $5,000, while **FORD** spent about $1,200.

HE MAY BE ONLY 33, but Alexander Doubilet is playing in the big leagues: He manages the operations of Privatbank's international division and bank activity automatization as first deputy chairman of the bank board. Privatbank's automatization required it to develop several programs; "Bank Operation Day" is one example. Doubilet gets kudos from his peers for his use of available technology. Such recognition should continue as the young man has set ambitious information technology objectives for his bank.

Alexander Doubilet
Privatbank, Ukraine

USING HER EXPERIENCE of business/information systems relationships, gleaned from when she ran her own consulting firm, 47-year-old IS staff manager Birgitta Strömberg is building a new IS organization at Scania. She knows the IS department must never lose sight of the company's objective, so she plans to develop a system that views the two as interdependent. "Our strength lies in our ability to vary and integrate our systems so that they all work together in a fully compatible global network," Strömberg says.

Birgitta Strömberg
Scania, Sweden

MORE ▸

Company	Industry/Description	Country	Revenue ($ in millions)
Skoda automobilova AS	Automotive. Majority-owned by Volkswagen AG in Germany, it is the automotive division of a heavy industrial conglomerate	Czech Republic	$1,191
Sumitomo Group	Banking. One of Japan's largest and oldest industrial groups, centered around Sumitomo Bank and Sumitomo Corp.	Japan	$165,051
Swissair	Transportation. International airline with extensive global air network system	Switzerland	$4,300
Tata Engineering & Locomotive Co. Ltd.	Automotive. Produces commercial vehicles and passenger cars and provides service, repairs and spare parts	India	$1,200
The Tata Iron & Steel Co. Ltd.[1]	Metals. Manufactures finished steel, semifinished steel, welded steel tubes and seamless tubes	India	$1,219
Telecom Australia	Communications. Australia's dominant telecommunications carrier	Australia	$9,500
Telecom Italia S.p.A.[1]	Communications. Provides worldwide telecommunications services using satellite systems, radio stations, shipboard installations and dedicated networks	Italy	$18,680
Tokyo Electric Power Co., Inc.	Utilities. Japan's largest electric power supplier in the Kanto region for commercial and industrial use	Japan	$47,339
Toronto Stock Exchange[1,2]	Financial Services. Facilitates trading of secondary market equities and options	Canada	$55
Toyota Motor Corp.	Automotive. One of the world's largest automakers operates factories worldwide	Japan	$94,600
TransCanada Pipelines Ltd.	Oil & Gas. Pipeline for transportation of natural gas; sells natural gas	Canada	$3,205
United Health Care Corp.[1]	Insurance. Managed health care insurance business	USA	$3,769
United Parcel Service, Inc.	Transportation. World's largest package delivery company provides international service in more than 180 countries	USA	$19,600
VARIG Brasilian Airlines SA	Transportation. Air mail and transport services for both domestic and international	Brazil	$2,035
Vale Do Rio Doce, Companhia[1]	Mining and Other Process Manufacturers. World's largest iron ore producer and exporter	Brazil	$2,269
Volvo AB	Automotive. Manufactures cars, trucks, buses, construction equipment, marine and industrial engines, aircraft and space engines and components	Sweden	$14,252
Wal-Mart Stores, Inc.[1]	Retail. General-merchandise discount stores provides a wide selection of products at low prices	USA	$67,345
Washington State Department of Information Services[1,2]	Government. Provides telecommunications services and technology oversight for state agencies and local governments	USA	$90
Wells Fargo & Co.	Banking. Holding company with subsidiaries that provide commercial banking, investment advisory, international and credit-card services	USA	$4,854
Weyerhaeuser Co.[1]	Mining and Other Process Manufacturers. Private owner of softwood timber and one of the largest forest products companies worldwide	USA	$10,398
Winterthur Schweizerische Versicherungs Gesellschaft	Insurance. Offers insurance coverage worldwide for motor vehicles, public liability, general accidents, property, life and health	Switzerland	$12,019
Xerox Corp.	Appliances and Electronics/Electrical/Photographic Equipment. Document processing and related products	USA	$17,410

All dollar figures are for most recent fiscal year available. [1]1994 fiscal year [2]Government budget [3]1995 fiscal year *Computerworld estimate **Does not include factory automation or wages and salaries

Profit ($ in millions)	IS employees	IS spending ($ in millions)
$1	169	$11
$71	NA	NA
$40	500-999	$100-$249
NA	475	$25
$58	250-499	$5-$9
$1,500	2,500-4,999	$500-$1,000
$2,087	1,000-2,499	$500-$1,000
$622	NA	NA
NA	200	$21
$1,270	1,000-2,499	$35**
$269	100-249	$25-$49
$288	500-999	$100-$249
$900	4,000	$200*
$0	420	$45
$645	325	$45
$198	1,000-2,499	$250-$499
$2,333	1,000-2,499	$250-$499
$0	420	$90
$612	1,000-2,499	$100-$249
$1,197	500-999	$100-$249
$219	1,000-2,499	$250-$499
-$126	1,000-2,499	$500-$1,000

Faces

THE DEVELOPMENT OF standard systems throughout Skoda automobilova is corporate executive director of IS Claus Hohmann's main objective. The 49-year-old focuses his attention on this pursuit because he knows it will simplify customer-to-customer processes. He says he plans to "tune up for the 21st century via standardization." Simplification provides a background for organization, and Hohmann knows this will create a solid organization.

Claus Hohmann
Skoda, The Czech Republic

SIXTEEN YEARS of front-line experience with IT business initiatives gives Weyerhaeuser Timberlands geographic IS project director Dianne Lyles a generous supply of IS insight. Among other things, she is instrumental in implementing the company's Resource Management System, designed to manage timber harvesting while protecting habitat. "As a manager within the IT community, I try to continually remind myself that advising the customer not to further automate is a viable business recommendation," she says.

Dianne Lyles
Weyerhaeuser Co., USA

TALK ABOUT successful re-engineering. Lucia, the new client/ server network at Royal Dutch PTT Telecom, has cut order processing time in half, the company says.

As IS AND TELECOMMUNICATIONS general superintendent at Varig Brasilian Airlines, José Carlos Martinez Sabate dreams of a self service system where passengers handle their own reservations, payments and tickets, just like a bank automated teller machine. His combination of IS and telecommunications skills makes him an ideal candidate to implement such a system. So does his international experience: At 42 years old, he has held positions in both France and Spain.

José Carlos Martinez Sabate
VARIG Brasilian Airlines

— Compiled by Amy Malloy, Researcher, Computerworld USA.

The Global

O F THE 18 INDUSTRIES in the Global 100, banking has the best representation, with 16 entries. This is no surprise, given the global reach and heavy IS reliance that characterize many of these world-class institutions. Transportation follows with 13 entries, automotive with 10 and government with 8. Together, these industries represent nearly half of the companies in the Global 100. Page numbers refer to the first page of the article(s) in which the company appears.

ILLUSTRATION: PETE BAROKAS

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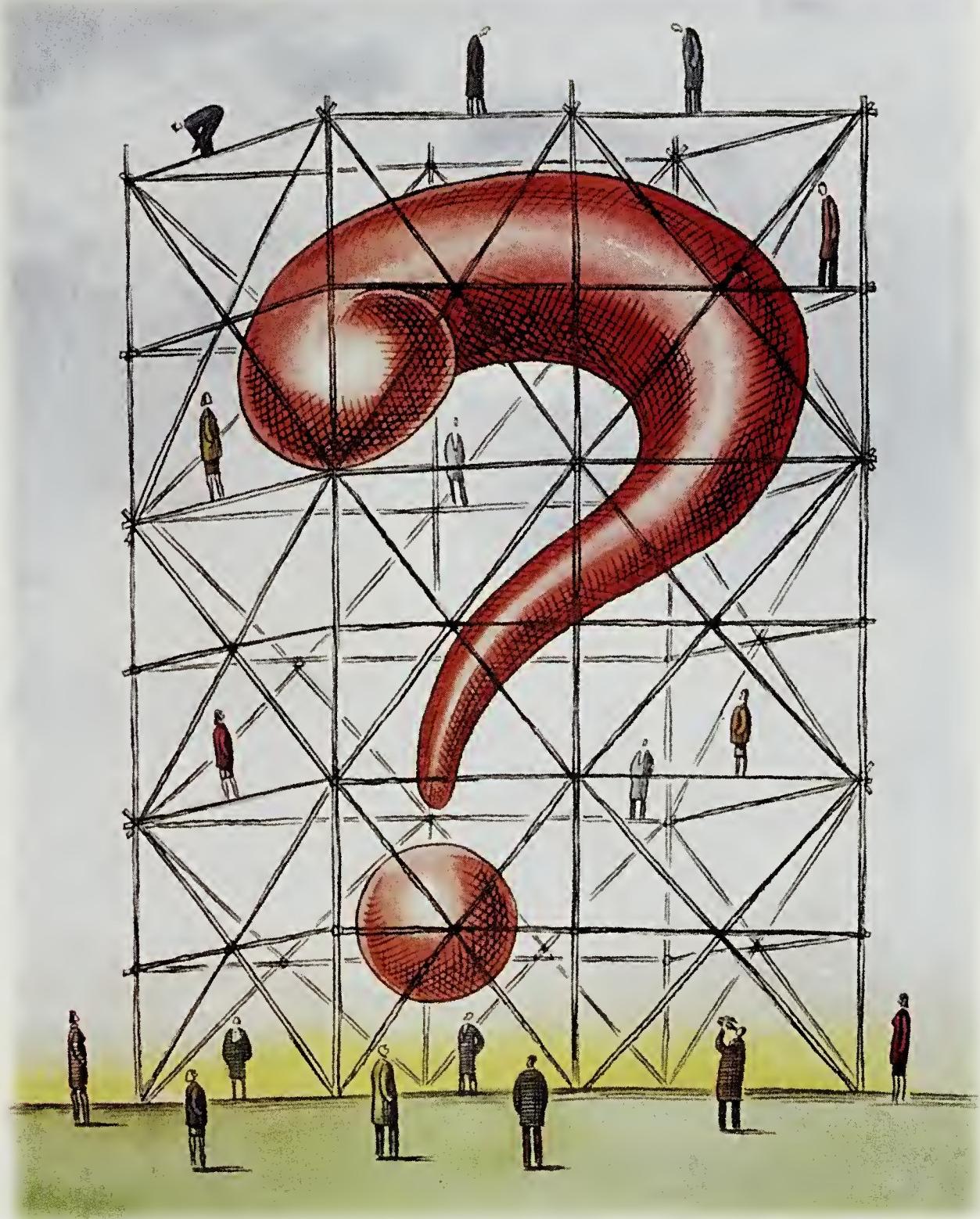
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